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Visual perception -- its role in reading

Lucille M. Harrington

VISUAL PERCEPTION -- ITS ROLE IN READING

by

Lucille M. Harrington

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Sister M. Juliette [illegible]

(Advisor)

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THE PROBLEM

Introduction

In today's era of technology, reading remains a most valuable tool to man. The importance of radio and television as means of communication cannot be minimized. Reading, however, is still the basic avenue of gaining and disseminating information. Through it individuals improve their educational and social knowledge and understandings which enables them to function in modern society. "Democracy and ignorance do not go together. A citizen must be able to read and to judge what he reads. He must read widely and frequently. . . . Reading is a man's bulwark against loneliness --- his window on life, his unending delight. Reading gives access to life's robe and miter. . . . It brings yesterday and tomorrow into now."[1]

The most important goal of education is to develop the child's ability to interpret printed materials of all types at progressive levels of complexity. Proficiency in reading dictates success or failure in school. Studies

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[1]Russell G. Stauffer, Teaching Reading As a Thinking Process (New York: Harper and Row, Publishers, 1969), p. xv.

examining the reasons for students dropping school reveal inability to read as a prime factor. "A chief stumbling block of potential dropouts in school and industry is their lack of ability to read."[1]

Teachers realize that learning to read involves a myriad of skills. They are concerned with all causal factors that contribute to incompetence in this ability. A most perplexing problem to educators involves the student with average or above-average intelligence who for some reason does not learn to read. Since reading is recognized as a perceptual act, authorities suggest that some cases of reading failure may be due to impairments of perceptual functions. Children may enter school lacking the basic skills essential for optimal learning.

Statement of the Problem

Research proves that a higher percentage of boys than girls experience difficulty in learning to read.

The major purpose of this study was to compare the patterns of visual perceptual development between boys and girls entering first grade by assessing areas in which differences were evidenced. Specifically, the following questions were considered:

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[1]Harold M. Nason, "The Developmental Program Meets the Challenges of Potential School Dropouts," Reading and Inquiry, edited by J. Allen Figurel, International Reading Association Conference Proceedings, Vol. 10 (Newark, Delaware, 1965), p. 263.

1. Does a difference in the stage of perceptual development exist between the sexes?
2. Which of the distinct visual functions evaluated by the Frostig Developmental Test of Visual Perception differ from each other?
3. Can the results of this study be effectively reflected in planning differentiated reading readiness programs?

Significance of the Problem

Learning to read is a complex process. Educators believe that defective perceptual functioning plays an important role in producing reading retardation. "There are many different possible causes of learning disability but perhaps the largest single cause right now seems to be the presence of so-called perceptual or visual problems."[1] As in other areas of growth, children develop visual perceptual skills at different rates. A child having a developmental lag in these abilities finds learning to read a frustrating experience.

Poor perception is considered to be a functional impairment. "Experience indicates that there are few educable youngsters with functioning perceptual handicaps who cannot

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[1]Louise Bates Ames, "Prevention of Learning Problems; Better Than Cure," Journal of Learning Disabilities, II, No. 6 (June, 1969), 337.

be helped. Our greatest concern, then, should be with our frequent failures to assess and to correct the disabilities."[1]

Preventing learning problems is more effective than curing them. It can be assumed that identity of children with perceptual deficiencies would be the initial step for planning remediation. Following identification, a program could be constructed that would allow a child the opportunity to develop mature perceptual skills.

Scope and Limitations

To compare the development of visual perceptual growth of boys and girls at the first grade level, the Marianne Frostig Developmental Test of Visual Perception was administered to nineteen boys and nineteen girls entering the first grade at the Cumberland School in Whitefish Bay, one of the more affluent suburbs of Milwaukee, Wisconsin.

From the socioeconomic viewpoint this community is considered above-average. All the children tested had had the advantages of a two-year kindergarten program. Included in their kindergarten training were some phases of formalized reading-readiness instruction. The scope of the readiness program varied for the individual child. No effort was made to separate boys and girls.

Though this study was limited by the size of its sampling, it aimed to stimulate thinking among personnel planning curriculums for this particular area.

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[1]Dr. Paul J. Kinsella, "The Place of Perception in Improving Reading Comprehension," Journal of the Association for the Study of Perception, III (DeKalb, Ill: Association for Study of Perception, Fall, 1968), p. 18.

Procedure

The Marianne Frostig Developmental Test of Visual Perception was the standardized test used in this survey. This test established individual perceptual quotients by evaluating five distinct areas of visual perceptual growth. The mean score for the boys and the mean score for the girls were derived for each of the five subtests and for the total test. These data were subjected to the t-test to determine significant differences between the perceptual development of boys and girls, and to appraise areas in which differences occurred. Tables show a summarization of the results. Graphs depicting individual results for each subtest and for the total test clarify the writer's observations and conclusions.

CHAPTER II

THE PERCEPTUAL PROCESS IN READING

The Nature of Perception and Intelligence

Viewpoints regarding the nature of perception vary. The gestaltists believe that perception is innate. Others contend it is a learned sequential process of development. All consider visual perception a function separate from visual acuity. They differentiate between the processes of seeing and perceiving. Visual acuity concerns itself with the organ of sight; visual perception with the mental response to observed stimuli.

Frostig defines perception as "the ability to recognize and discriminate visual stimuli and to relate those stimuli by associating them with previous experiences. Visual perception is not merely the ability to see accurately. Interpretation of visual stimuli occurs in the brain not the eyes."[1] She clarifies this statement through the use of these four lines  , which are seen through the eye, but recognized as a square by the brain.

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[1]Gloria M. Follett, "Learning Products--Visual Perceptual Skills," Journal of the Association for the Study of Perception, II, No. 2 (DeKalb, Illinois: Association for the Study of Perception, Fall, 1967), p. 1.

In studying the relationship of visual perceptual abilities and early reading progress, Goins also viewed perception as a mental process. She states: "Visual perception, as the term is used here, is that process by which phenomena are apprehended by the mind through the medium of the eye."[1]

Strauss and Lehtinen contend: "Perception can be considered an activity of the mind, intermediate between sensation and thought. It is the mental process which gives particular meaning and significance to a given sensation and therefore acts as the preliminary to thinking."[2]

A child is born with the physical requirements for visual perception --- the sense of sight and a neural mechanism capable of interpreting stimuli. The organization and response attached to the stimuli is dependent upon the individual's stage of development.

Today much attention is focused on the theories of the Swiss psychologist, Piaget. He conceives intellectual development to be perceptually oriented. In his opinion perceptual functioning is essential for adequate cognitive functioning. Intellectual response follows a course of development dependent upon earlier sensory-motor experiences and achievement. Piaget assumes the development of intellect

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[1]Jean Turner Goins, Visual Perceptual Abilities and Early Reading Progress, Supplementary Educational Monographs, No. 87 (Chicago: University of Chicago Press, February, 1958), p. 1.

[2]Alfred A. Strauss and Laura E. Lehtinen, Psychopathology and Education of the Brain-Injured Child (New York: Grune and Stratton, 1947), p. 28.

to be "a continual process of organization and reorganization of structure, each new organization integrating the previous one into itself."[1] Piaget states: "Life is a continuous interaction between the organism and his environment."[2]

He sees this interaction involving two processes: assimilation and accommodation. Assimilation occurs when something perceived in one's environment is utilized and incorporated by an individual. Accommodation involves the method of coping and responding to the event. Continuous assimilation and accomodation enables one to function more capably within his environment. "Adult, cognitive operations can be seen to be the end result of a long process of development which proceeds through a process of internalization of the full behavioral sequences of activities involved in repeatedly coping with, or exploring any given object."[3]

Piaget has broken this course of intellectual development into sequential periods that range from the infantile sensorimotor stage to the mature intellectual stage. These periods are not sharply delineated, but overlap one another. Development in the more complex stages depends upon successful attainment in the earlier ones. According to Piaget, these phases of intellectual development are:

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[1]John L. Phillips, The Origins of Intellect: Piaget's Theory (San Francisco: W. H. Freeman and Co., 1969), p. 10.

[2]J. McV. Hunt, Intelligence and Experience (New York: The Ronald Press Company, 1961), p. 111.

[3]Perceptual-Motor Training and Cognitive Achievement (Chicago: Reading Research Foundation, Inc., 1967), p. 8.

1. Sensorimotor Period: Birth to two years

During this period the child acquires skills through organizing and coorindating sensory information. Cognitive function is completely dependent upon what is in one's environment and can be physically manipulated. A child perceives his environment within the realm of his immediate experience. Visual-motor skills and eye movements, the basis of later perceptual development are established at this time.

2. Concrete-Operations Period: Two to twelve years

a. Preconceptual Phase: Two to four years

This is the period that is dominated by the growth of auditory perceptual skills and the acquisition of language. During this stage the child engages in playful make-believe and imitation. Images and thought processes upon which language development depends are acquired.

b. Intuitive Phase: Four to eight years

This is largely a transitional stage when environmental impressions and interpretations are altered. It is the period of maximum development of visual perceptual abilities. It is the time when children are expected to learn to read. Lagging visual-perceptual development may prove a deterrent to reading success.

c. Concrete Operations Phase: Eight to twelve years

At this time the foundations for logical thinking are established. Higher thought processes develop markedly after the age of eight. The skill to relate specific information to known information becomes apparent. Concept formation and thinking in logical sequence are the characteristics of this period. Deficits in these skills will contribute to reading disabilities at this time.

3. Formal Operations Period: Twelve to sixteen years

During this last phase of intellectual development, the child begins to think and reason beyond his world of realism. Cognition begins to rely upon symbolism and the use of propositions. It is the time when one becomes " . . . an individual who thinks beyond the present and forms theories about everything, delighting especially in considerations of that which is not."[1] One should become capable of reasoning at an adult level. Intellectual maturity is reached.

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[1]Henry W. Maier, Three Theories of Child Development (New York: Harper and Row, Publishers, 1965), p. 135.

"Basically, the mental development of the child appears as a succession of three great periods. Each of these extends the preceding period, reconstructs it on a new level, and later surpasses it to an even greater degree."[1]

The following statement appears in a report published by the Wisconsin Department of Public Instruction: "Studies of early childhood development have discredited the theory that intelligence is a single, fixed phenomenon. . . . Another interpretation of mental ability that has aroused interest comes from Raymond B. Cattell, professor of psychology at the University of Illinois, who breaks intelligence into two general categories called "crystalized" and "fluid." Fluid intelligence may be an innate thing, but crystalized intelligence is shaped by a child's experiences."[2]

Perceptual Abilities Related to Reading

Beginning with the child's first day of school, all teachers realize that "reading is the most important subject taught in school. The teaching of reading is basically a problem of visual perception."[3] Dr. Marianne Frostig states:

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[1]Jean Piaget and Barbel Inhelder, The Psychology of the Child (New York: Basic Books, Inc., 1969), p. 152.

[2]"Focus: IQ Tests, The Newsletter, Vol. 23, No. 5 (Madison: Wis. Dept. of Public Instruction Publication and Informational Services, January, 1970), p. 14.

[3]Guy T. Buswell, "The Process of Reading," The Reading Teacher, XIII (December, 1959), p. 114.

"Visual perception is always involved in reading."[1] Spache provides this simple word-perception theory of reading: ". . . in its simplest form, reading may be considered a series of word perceptions."[2]

It is generally conceded that the period of maximum visual perception normally occurs with the child's general development between the ages of $3\frac{1}{2}$ and $7\frac{1}{2}$ years. By the time the child is exposed to the formal reading process his visual perception should have fully reached maturity. A lag in this development could cause him to experience learning difficulties no matter what his intelligence.

A universally accepted generalization is that children vary in levels and patterns of perceptual development. Though a child's eyes may be normal, he may have immature visual perception. Visual perception and visual acuity are two separate and distinct functions. Seeing a thing does not mean noticing details, likenesses, and differences that are obvious to other children. A child beginning to read can usually identify pictures of familiar objects; and has the ability to understand the importance of particular details in letter shapes, and their spatial relationship to one another within the total word shape. "Visual perceptual problems generally fall into

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[1]Marianne Frostig, PhD., "The Need of Teachers for Specialized Information on Reading," in The Teacher of Brain-Injured Children, ed. by William M. Cruickshank (Syracuse: Syracuse University Press, 1966), p. 95.

[2]George Spache, Toward Better Reading (Champaign: Garrard Publishing Company, 1964), p. 349.

three categories: 1) difficulty in distinguishing between separate objects, 2) difficulty in recognizing parts of a whole, 3) difficulty in synthesizing or combining parts to form a whole."[1]

Harris attributes one difficulty in building up a sight vocabulary to "deficiencies in failure to perceive a word clearly and the inability to remember what a word looks like."[2]

The importance of visual perception in learning to read has received much attention. All beginning reading programs and readiness tests attempt to assess the development of perceptual skills. A study made by Goins reveals a medium-high correlation between visual perception skills and reading. She states in the conclusion of her study: "Efficient reading involves ability not only to hold in mind the "wholeness" of a word, phrase, or sentence (that is, to perceive its larger relationships both mechanically and ideationally) but also to attend to individual words and, at times, to parts of words. Perceiving in a general way the whole but not discriminating clearly among its component elements (letters, words, phrases) may cause as much

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[1]Carl B. Smith, "Establishing Central Reading Clinics: The Administrator's Role," Target Series, Book Two (Newark: International Reading Association Publication, 1969), p. 13.

[2]Albert J. Harris, How To Increase Reading Ability (New York: David McKay Company, Inc., 1961), p. 64.

difficulty in reading as does concentrated attention or word analysis and word calling."[1]

"Visual perceptual disturbances may include such facets as an inability to differentiate between figure and ground, discriminate between like and unlike figures, retain constancy of form regardless of changes in size and spatial position, unite the parts and the whole configuration, identify forms having identical versus nonidentical spatial position, and interpret perceptual stimuli in a meaningful manner."[2] The need for corrective and preventive visual perceptual programs has prompted specialists in the field of reading to devise tests to identify and diagnose perceptual traits. L. A. Bender (The Bender Visual Motor Gestalt Test for Children), S. A. Kirk and J. P. McCarthy (Illinois Test of Psycholinguistic Abilities, 1961), Marianne Frostig, D. W. Lefever, and J. R. Whittlesey (The Marrianne Frostig Developmental Test of Visual Perception), 1963, and Keith E. Beery (Developmental Test of Visual-Motor Ingration, 1967) have developed effective evaluation scales. Frostig sees the following visual perceptual abilities as being involved in the reading act: (1) visual-motor coordination, (2) figure-

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[1]Jean Turner Goins, Visual Perceptual Abilities and Early Reading Progress, Supplementary Educational Monographs, No. 87 (Chicago: University of Chicago Press, 1958), p. 104.

[2]Myrene McAninch, "Body Image as Related to Perceptual-Cognitive-Motor Disabilities," Learning Disorders, Vol. 2, Jerome Hellmuth, Editor (Seattle: Special Child Publications of the Seguin School, 1966), p. 144.

ground perception, (3) perceptual constancy, (4) perception of position in space, and (5) perception of spatial relationships.[1]

A look at the above perceptual skills will demonstrate how their functions are manifested in the reading process.

Visual-motor coordination may be defined "as the ability to coordinate vision with movements of the body or with movements of a part or parts of the body."[2] It is important in the reading act since it relates to the establishment of eye-movement and directionality patterns, prerequisites for reading. Perception of both form and direction is required in letter and word discrimination. Directionality is the only difference between 'b' and 'd'. Disability in visual-motor coordination prevents adequate adjustment to environmental demands. A child with poor motor-visual coordination appears clumsy, unstable, unpredictable, and has a poor attention span. His relationship with adults and his peers proves unsatisfactory. His self-image is negative. All these traits impede his reading progress.

Figure-ground perception involves the ability to isolate and select specific stimuli (figure) from its surroundings (ground). Proficiency in this skill allows one to focus attention on selected stimuli seen in relationship to its ground. Lacking this ability, a child is handicapped

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[1]Marianne Frostig and David Horne, The Frostig Program for the Development of Visual Perception (Chicago: Follett Publishing Company, 1964), p. 10.

[2]Ibid., p. 16.

in developing reading skills. His attention shifts from one stimuli to another. He appears careless, inattentive, and disorganized. He loses his place on a page, skips sections, and fails to answer questions relevant to specific sentences. It may be difficult for him to find words in a dictionary and to use a table of contents. Lack of precision in discrimination of visual sequences, may cause failure in the analysis of longer words using successive syllables. He may be hindered in mastering many study skills.

Perceptual constancy denotes ability to perceive an object as having invarient properties; such as shape, size, color, and brightness. An object retains its identity regardless of the angle, method or time of observation. Altering its size or color fails to confuse the viewer. Immaturity in this area of perceptual development results in the inability to transfer visual patterns to new settings. A child will meet difficulty in developing a sight vocabulary and in learning or doing work involving any symbols. He may learn a number, letter, or word in one form but fail to recognize the symbol in another situation. A word written in a different color, size or type will appear unfamiliar. Obviously, this disability may impede his reading progress.

Perception of position in space may be defined "as the perception of the relationship of an object to the observer."[1] A person is always the center of his own spatial

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[1] Ibid., p. 40.

world and perceives stimuli from this point. From the body's position objects are seen as being behind, before, above, below, or to the side of himself. Space perception is usually developed by manipulating objects in different positions up, down, left, right, etc. Confusion in directional movements may result in confusion of position within a pattern.

A child lacking discriminatory skills on spatial orientation may be unable to differentiate between symbols that are alike in shape but placed in different positions. He may confuse 'b' and 'd'; 'p' and 'q'' 'u' and 'n'; 'on' and 'no'; 'saw' and 'was'; '24' and '42' etc. He may also confuse the sequence of words. Often children disabled in this perceptive ability are fluent mirror-readers.

A deficiency in perceiving spatial position is further evidenced through the child's handicap in adjusting to his environment. His visual world is distorted. He will be clumsy and hesitant in his movements. All these factors will contribute to making learning difficult.

Perception of spatial relationships includes the ability of an observer to perceive two or more objects, both in relation to himself and to each other. It is the most advanced and complicated of the perceptive processes. A number of different parts are seen in relation to each other. Each part is given equal attention. The parts are seen in temporal sequence and integrated into a total picture. Integration is so fast in forming the visual pattern that it appears to be reflexive.

Distortion in this perceptual area affects visual memory. It becomes difficult to conceptualize and remember simple patterns and sequences of letters in a word. Letters within a word may be interchanged. The order of words within phrases and sentences may appear different from the one in which they are presented. As long as the handicap persists, success in all academic areas may be hindered.

For a long time educators have considered skills of visual discrimination closely related to reading success. Magdalen Vernon states: "Most children perceive and memorize shapes after the very early stages of reading, though some children develop the capacity more slowly than others. It appears that in certain cases of reading backwardness there is a definite maturational lag in perception, the cause of which is unknown."[1] A major contribution in this area of reading instruction will be the development of tools to identify and diagnose perceptive processes.

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[1]Magdalen Vernon, Visual Perception and Its Relation to Reading, An Annotated Bibliography (London: English University of Reading, 1966), p. 1.

CHAPTER III

EXPERIMENTAL PROCEDURE

Restatement of the Problem

Research studies disclose that many pupils achieve below their potential capacities. Indications persist that sensory limitations may be a factor in the origin of these problems. This study was undertaken to determine if there are any significant visual perceptual differences between boys and girls entering first grade. It was hoped that an analysis of the results might offer information that could be valuable in planning differentiated instruction in reading-readiness programs.

Subjects Participating in Study

The subjects of this investigation included first grade pupils at the Cumberland Elementary School in Whitefish Bay, Wisconsin. Whitefish Bay is a suburban Milwaukee community with a high percentage of its population being professional people.

The children participating in this study ranged in age from 5 years, 11 months to 6 years, 11 months. They had been assigned to first grade after completing two years of kindergarten. Their kindergarten experiences included some

phases of formalized reading-readiness preparation. The scope of this program was dependent upon teacher judgment. Sex was not a determining factor in planning the individual's curriculum.

Testing Procedure

The Marianne Frostig Developmental Test of Visual Perception was given by the writer to forty-one pupils enrolled in first grade. This test measures five visual perceptual skills related to reading: eye-motor coordination, figure-ground perception, perception of form constancy, perception of spatial position, and perception of spatial relationships. It was administered in September, 1969 after school had been in session for two weeks. To establish student rapport, prior to testing, the tester had visited in the classrooms of the involved students on two different occasions.

Two sessions of approximately twenty-five minutes each were used for test administration. The maximum number of children tested simultaneously was eleven. During the testing sessions the children were seated at individual tables. While one group was being evaluated, other members of the class were taken outside for a recess by their homeroom teacher.

Nineteen girls and twenty-two boys participated in the original test survey. The scores of three boys were not included in analyzing final results because two of these boys

had attended a different school during kindergarten and the other was ill and did not complete his test. All tests were scored and interpreted by the tester.

Scoring and Treatment of Data

Following the administration and scoring of the test, the mean scores of the boys and girls were computed for their performance on each of the five sub-tests and for the total test. Essential statistical data were machine-computed. The difference between the means for each section was subjected to the t-test. The derived critical ratio was used to ascertain the significance of the mean differences for subtest and total test scores. The information is summarized in tabular form.

After determining individual Perceptual Quotients a graph was made to represent the difference between boys and girls in the pattern of visual perceptual growth.

CHAPTER IV

PRESENTATION AND INTERPRETATION OF DATA

This research was designed to compare the developmental pattern of visual perceptual abilities of first grade boys and girls. The writer attempted to determine the specific areas of variation and to assess the significances of the variances. Nineteen girls and nineteen boys participated in the study. The Marianne Frostig Developmental Test of Visual Perception was the standardized instrument used in the testing program. This test measures the developmental rate of five distinct perceptual functions.

Table 1 presents a comparison of the test scores of the two groups. The statistical data used to determine the significance of the differences between the averages for each subtest and for the total test are shown.

Four subtests evidence a significant difference between the mean performance of boys and girls. At the .01 level of confidence a difference was found on the following three subtests: (1) Eye-motor Coordination, (2) Perception of Form Constancy, and (3) Perception of Spatial Relationships. The means of the test, assessing perception of spatial position also showed a significant difference, but only at

TABLE 1

COMPARISON OF THE RESULTS OF THE FROSTIG DEVELOPMENTAL TEST OF VISUAL PERCEPTION FOR BOYS AND GIRLS

Tests	Mean		SD		D_M	$S_{E_{D_M}}$	t-ratio	Statistical Significance
	Boys	Girls	Boys	Girls				
Eye-Motor Coordination	10.89	13.11	1.48	2.55	2.22*	.483	4.596	.01
Figure Ground	10.68	11.32	2.25	1.69	.64*	.438	1.461	NS
Form Constancy	10.11	11.37	1.83	1.75	1.26*	.356	3.539	.01
Position in Space	9.63	10.58	2.03	2.01	.95*	.452	2.102	.05
Spatial Relations	11.00	11.84	1.59	1.46	.84*	.258	3.256	.01
Total	52.32	58.21	5.54	5.26	5.89*	3.230	1.824	NS

* Difference favors girls

the .05 level. Evidently boys and girls vary most in these areas of perceptual development. The one subtest displaying no significant difference was the one evaluating figure-ground perception.

A difference of 5.89 between the means of the two groups for the total test proved to be insignificant at both the .01 and .05 confidence levels. This result indicates that for these groups the total overall perceptual development is similar for boys and girls at this age level. Standard deviations of 5.26 and 5.54 for total-test scores reflect a slightly greater degree of variability among the boys.

The Frostig Developmental Test of Visual Perception was standardized in 1963. A scaled score of 10 for each subtest and of 50 for the total test was calculated to designate normal perceptual growth. In Table 2 are shown the number of students earning specific scaled scores on the individual subtests.

On the subtest assessing eye-motor coordination, two boys and two girls scored below the standardized norm. In Table 1* the difference between the means of boys and girls on this test was noted. It proved significant at the .01 level of confidence. The reason for this apparent discrepancy may be attributed to the fact that six girls exceeded the test ceiling in this specific area of perceptual development.

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*Supra, p. 23.

TABLE 2

NUMBER OF STUDENTS EARNING SPECIFIED SCALED SCORES ON SUBTESTS OF FROSTIG DEVELOPMENTAL TEST OF VISUAL PERCEPTION

Scaled Scores	Eye-Motor Coordination			Figure-Ground			Form Constancy			Position in Space			Spatial Relations		
	B	G	Tot.	B	G	Tot.	B	G	Tot.	B	G	Tot.	B	G	Tot.*
Below 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-7	1	0	1	1	0	1	0	0	0	3	1	4	0	0	0
8-9	1	2	3	6	4	10	8	3	11	6	4	10	4	1	5
10 (norm)	6	1	7	2	3	5	5	5	10	5	5	10	4	4	8
11-12	8	5	13	4	6	10	3	4	7	3	6	9	6	6	12
13-14	3	4	7	6	6	12	3	5	8	2	3	5	5	8	13
15-16	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Above test ceiling	0	6	6	0	0	0	0	2	2	0	0	0	0	0	0

* Designates boys, girls, total

A total of eleven children achieved below the norm on each of two tests: Figure Ground and Form Constancy. It is erroneous to assume the same children lacked maturity in both areas. The data in Table 2 indicate a ratio favoring the girls of 7 to 4 for the subtest measuring figure-ground perception. The ratio observed for evaluating form constancy was 8 to 3, again in the girls' favor. Thus a deficiency in one visual perceptual skill does not imply a deficiency in another.

Subtest V evaluates perception of spatial relationships. This is the most complex of the skills appraised. Five pupils failed to reach the mean score of 10 on this test. With the exception of one boy, however, scaled scores of 9 were earned. This outcome suggests that the implementation of a more discerning standardized test would have produced more relaible results.

The information comprising Table 2 is graphically represented in the Appendix by Figures 8 - 12. These graphs contrast the diversity between boys and girls in the five evaluated skills of perceptual growth. Figure 13 which appears in the Appendix contains a summation of the subtest scores. It compares the total developmental level of the boys and girls who were a part of this study.

The derived perceptual quotients for the thirty-eight subjects are seen in Figure 1. Standardization procedures for the Frostig Developmental Test of Visual Perception has established a perceptual quotient of 100 as the mean. A perceptual quotient of 90 signifies the score

below which a child should receive special training.[1] Figure 1 shows that no girl scored below the standardized mean. Only one of the six boys scoring below 100 would be in need of remediation to develop average perceptive abilities. These data imply a more discriminatory test should have been used in the evaluation of these two groups.

The individual scores of the boys and girls for each subtest are presented in Figures 2 to 7. Assigned pupil-numbers correspond with the individual's perceptual quotient rank. Pupil-number assignments are the same on each graph. This information was used to determine if individual patterns of perceptual development would appear. Examination of these data reveals no apparent pattern of perceptual development. However, the area or areas in which a child needs help are indicated. Boy Number 13 scored below the mean on Subtests I and IV; at the mean on Subtest III; and above the mean on Subtests II and V. His number assignment indicates that six boys earned a higher perceptual quotient rank. From these results one infers that strength in one perceptual ability does not assure strength in other areas of perceptual development. The chief value of this information lies in the help it offers in individual diagnosis and subsequent instructional work. The proper development of visual perceptual skills will aid a student in realizing his individual academic potential.

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[1]Marianne Frostig, et al. The Marianne Frostig Developmental Test of Visual Perception, 1963 Standardization, (Palo Alto, California: Consulting Psychologists Press, 1963), p. 479.

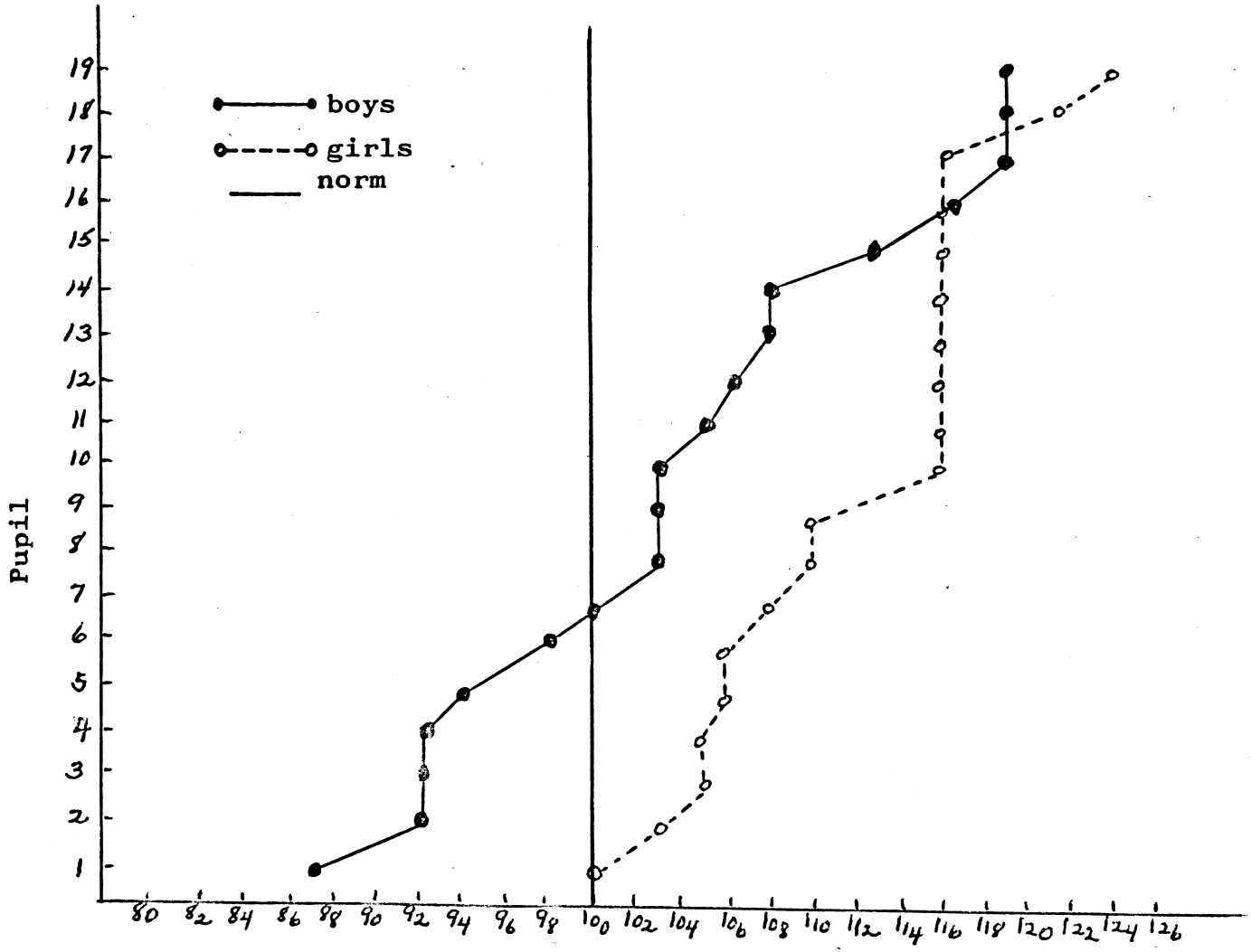


FIGURE 1. Comparison of Derived Perceptual Quotients of Boys and Girls

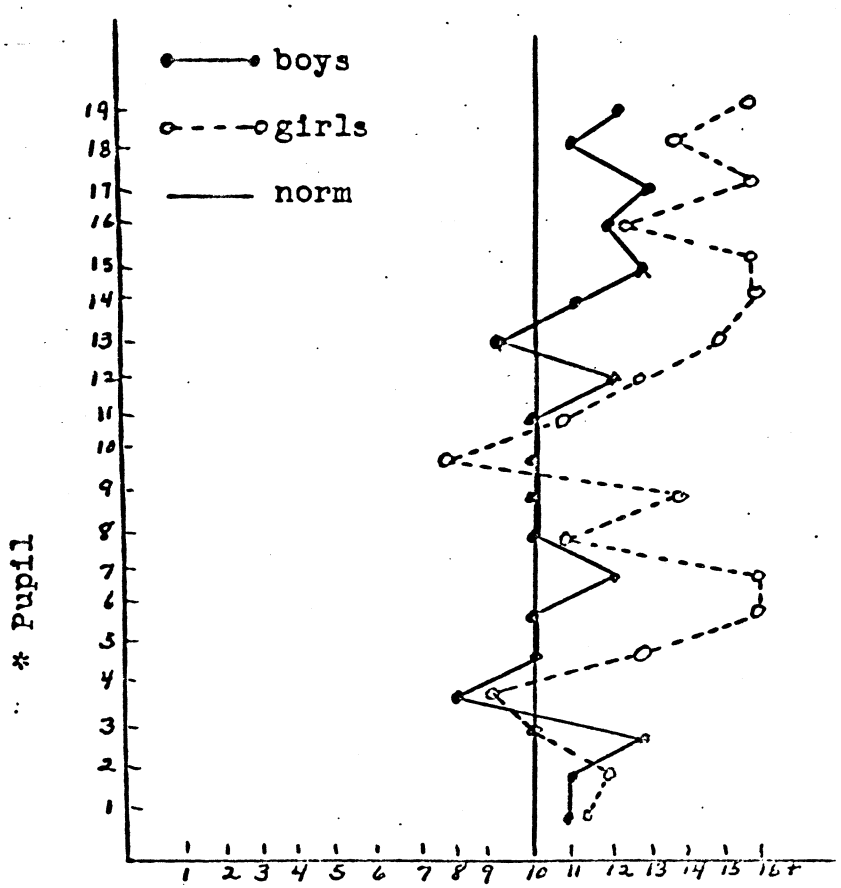


FIGURE 2. Individual Scaled Scores on Test of Eye-Motor Coordination

* Pupil number represents Perceptual Quotient Rank.

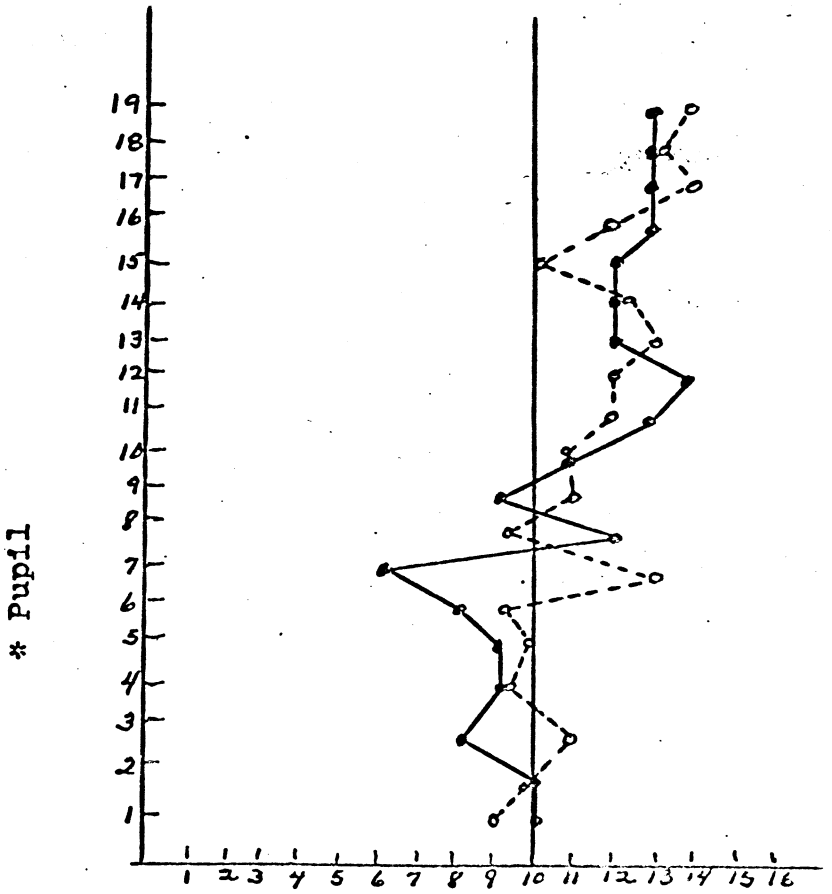


FIGURE 3. Individual Scaled Scores on Test of Figure Ground Perception

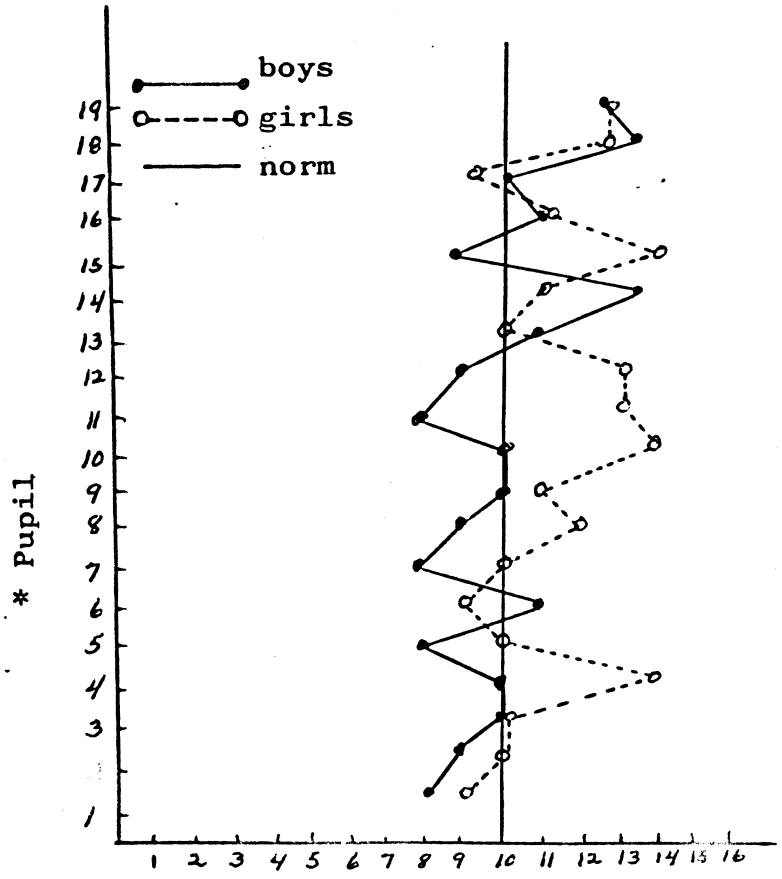


FIGURE 4. Individual Scaled Scores on Test of Form Constancy

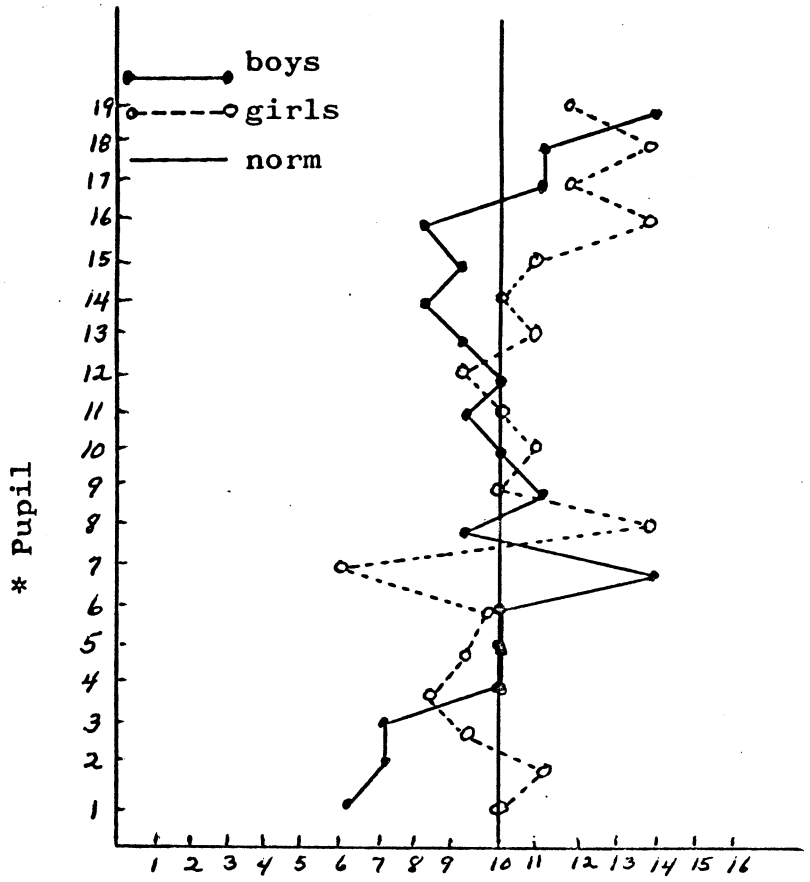


FIGURE 5. Individual Scaled Scores on Test of Position in Space

* Pupil number represents Perceptual Quotient Rank.

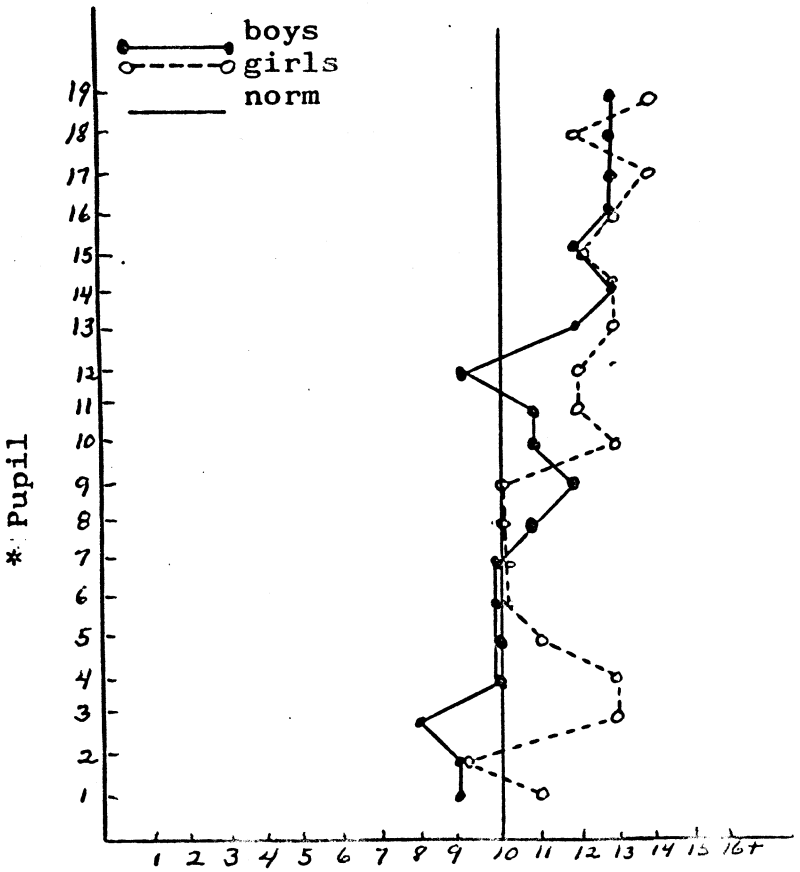


FIGURE 6. Individual Scaled Scores on Test of Spatial Relations

* Pupil number represents Perceptual Quotient Rank

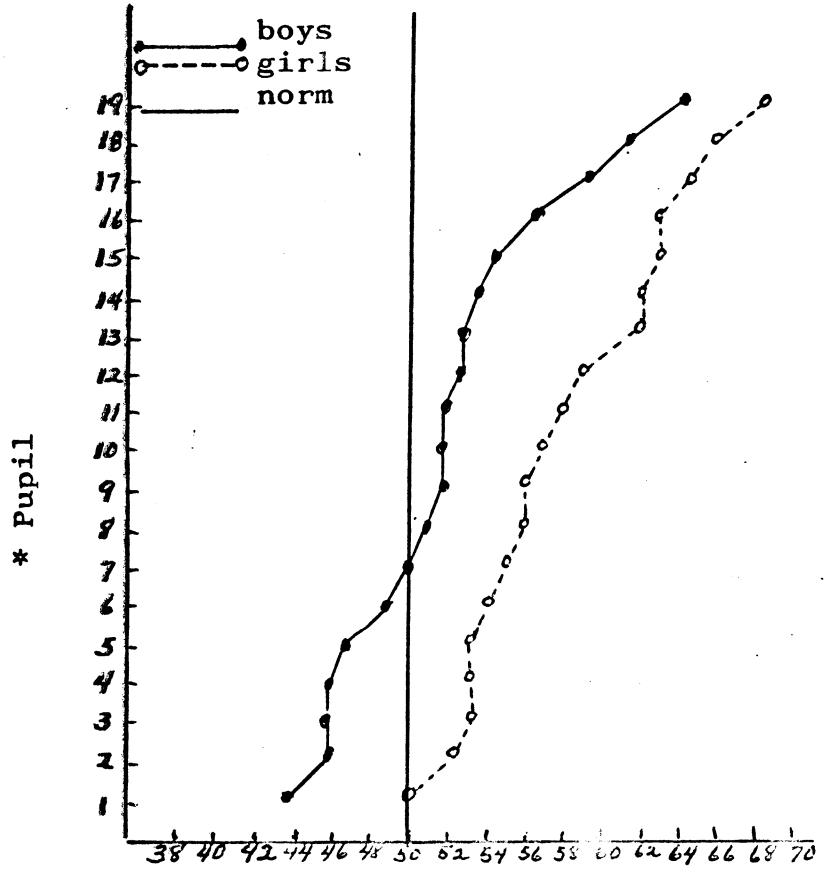


FIGURE 7. Summation of Individual Scaled Scores on Total Test

CHAPTER V

SUMMARY AND CONCLUSIONS

This study attempted to compare significant differences between the patterns of visual perceptual development for boys and girls entering first grade. Its objectives were three-fold: (1) to compare the pattern of visual perceptual growth of each of the sexes, (2) to determine the areas and degree of perceptual variation, and (3) to assess the value of offering differentiated reading-readiness programs.

Thirty-eight children participated in the study. The Marianne Frostig Developmental Test of Visual Perception was administered by the author to small heterogeneous groups of pupils enrolled in grade one. Scores obtained by this testing were subjected to appropriate statistical procedures. Derived data were the basis for determining the significance of the differences between the means of the five subtests and of the total test. Individual scores of the boys and girls were further analyzed for two reasons: (1) to discover variances in the specific perceptual abilities measured by the subtests, and (2) to note if any speical patterns of perceptual development were manifested.

Findings

The results of this study are, of course, limited by the small number of subjects involved. Findings relevant to the purposes of the investigation are as follows:

1. There was no significant differences between the mean performance of boys and girls for the total test.
2. There was no significant difference between the means of the subtest assessing eye-motor coordination.
3. A significant difference was found between the means of four subtests: evaluation of figure-ground perception, perception of form constancy, perception of position in space, and perception of spatial relationships.
4. All girls involved in this study performed at or above the standardized norms.
5. Of six boys attaining total scores below the established norm, only one was in need of special visual perceptual training.

Conclusions

The following conclusions are drawn by the writer from the stated findings of this study:

1. The visual perceptual abilities of girls entering first grade are more highly developed than those of boys. This difference, however, is statistically insignificant.

2. Immaturity in one visual perceptual skill does not imply immaturity in all, or any, of the others.
3. No specific pattern of visual perceptual growth is evidenced.
4. A greater degree of variability in perceptual development exists in boys.

Implications

From the data and observations made during this study the following implications can be drawn:

1. This study indicates that this kind of testing in the perceptual areas be applied as a screening device in early kindergarten so that remediation can take place before the experience of failure in beginning reading. This test is unique in providing follow-up learning materials and teaching suggestions to remediate perceptual deficiencies. They can be used both in classroom and clinic situations.
2. A more discerning standardized test is needed to validly evaluate perceptual growth for children at this age.
3. The merits of implementing kindergarten programs with increased emphasis on the development of visual perceptual skills for boys might be considered.

BIBLIOGRAPHY

Balmuth, Mariam. "Visual and Auditory Modalities: How Important Are They?" Current Issues in Reading. Edited by Nila Blanton Smith. Newark: International Reading Association, Inc., 1969.

Barsch, Ray H. Achieving Perceptual-Motor Efficiency. Seattle: Special Child Publications, 1967.

Beard, Ruth M. An Outline of Piaget's Developmental Psychology for Students and Teachers. New York: Basic Books, Inc., 1969.

De Hirsch, Katrina; Jansky, Jeanette Jefferson; and Langford, William S. Predicting Reading Failure. New York: Harper and Row, 1966.

Frostig, Marianne. "The Need of Teachers for Specialized Information on Reading," The Teacher of Brain-Injured Children. Edited by William M. Cruickshank. Syracuse: Syracuse University Press, 1966.

Frostig, Marianne and Horn, David. The Frostig Program for the Development of Visual Perception. Chicago: Follett Publishing Company, 1964.

Frostig, Marianne; Maslow, Phyllis; Lefever, D. Welty; and Whittlesey, John R. B. The Marianne Frostig Developmental Test of Visual Perception, 1963 Standardization. Palo Alto: Consulting Psychologists Press, 1964.

Goins, Jean Turner. Visual Perceptual Abilities and Early Reading Progress. Educational Monograph, No. 87. Chicago: University of Chicago Press, 1958.

Hunt, John McV. Intelligence and Experience. New York: The Ronald Press, 1961.

Kephart, Newell. The Slow Learner in the Classroom. Columbus, Ohio: Charles E. Merrill Publishing Co., 1967.

Kindred, Leslie W. The Intermediate Schools. New York: Prentice Hall, Inc., 1968.

Kolson, Clifford and Kaluger, George. Clinical Aspects of Remedial Reading. Springfield, Illinois: Charles C. Thomas, Publishers, 1963.

Maier, Henry W. Three Theories of Child Development. New York: Harper and Row, 1965.

McAninch, Myrene. "Body Image as Related to Perceptual-Cognitive-Motor Disabilities." Learning Disorders Vol. II. Edited by Jerome Hellmuth. Seattle: Special Child Publications, 1966.

Nason, Harold M. "The Developmental Program Meets the Challenges of Potential School Dropouts." Reading and Inquiry. Edited by J. Allen Figurel. Newark: International Reading Association, Inc., 1965.

Phillips, John L. The Origins of Intellect: Piaget's Theory. San Francisco: W. H. Freeman and Co., 1969.

Piaget, Jean and Inhelder, Barbel. The Psychology of the Child. New York: Basic Books, Inc., 1969.

Robinson, Helen M. and Smith, Helen K. Clinical Studies in Reading, III. Educational Monograph, No. 97. Chicago: University of Chicago Press, 1968.

Smith, Carl B.; Carter, Barbara; and Dapper, Gloria. "Establishing Central Reading Clinics: The Administrator's Role." Target Series Book Two. Newark: International Reading Association Publication, 1969.

Spache, George. Toward Better Reading. Champaign, Illinois: Garrard Publishing Company, 1964.

Stauffer, Russell G. Teaching Reading As a Thinking Process. New York: Harper and Row, 1969.

Strauss, Alfred A. and Lehtinen, Laura E. Psychopathology and Education of the Brain-Injured Child. New York: Grune and Stratton, 1947.

Vernon, Magdalen D. Visual Perception and Its Relation to Reading, An Annotated Bibliography. London: England University of Reading Press, 1966.

Vernon, M. D. A Further Study of Visual Perception. London: The Broadwater Press, 1952.

Articles and Periodicals

_____. "Focus: IQ Tests," The Newsletter, XXIII (January, 1970), 9-14.

_____. Perceptual Motor Training and Cognitive Achievement. Reading Research Foundation (1967), 3-16.

_____. "School Achievement, Reading Ability, and Specific Visual Perception Skills in Third Grade," Reading Teacher, XIX (April, 1966), 490-492.

_____. "Disturbances in Visual Perception," Journal of Educational Research, LVII (Nov., 1963), 160-162.

Bates, Louise Ames. "Prevention of Learning Problems: Better Than Cure." Journal of Learning Disabilities, II (June, 1969), 337-339.

Buswell, Guy T. "The Process of Reading," The Reading Teacher, XIII (December, 1959), 108-114.

Coleman, Howard. "Visual Perception and Reading Dysfunction," Journal of Learning Disabilities, I (February, 1968), 116-123.

Follett, Gloria M. "Learning Products--Visual Perceptual Skills," Journal of the Association for the Study of Perception, II (Fall, 1967), 1-6.

Haring, Norris G. and Ridgeway, Robert W. "Early Identification of Children with Learning Disabilities," Exceptional Children, XXXIII (February, 1967), 387-393.

Kinsella, Dr. Paul J. "The Place of Perception in Improving Reading Comprehension," Journal of the Association for the Study of Perception, III (Fall, 1968), 18-21.

Olson, A. V. "Frostig Developmental Test of Visual Perception as a Predictor of Specific Reading Abilities with Second Grade Children," Elementary English, XXXVIII (October, 1945), 869-872.

Shapiro, Irving L. "Visual Perception and Reading," Academic Therapy Quarterly, II (Winter, 1966-1967), 227-235.

APPENDIX I

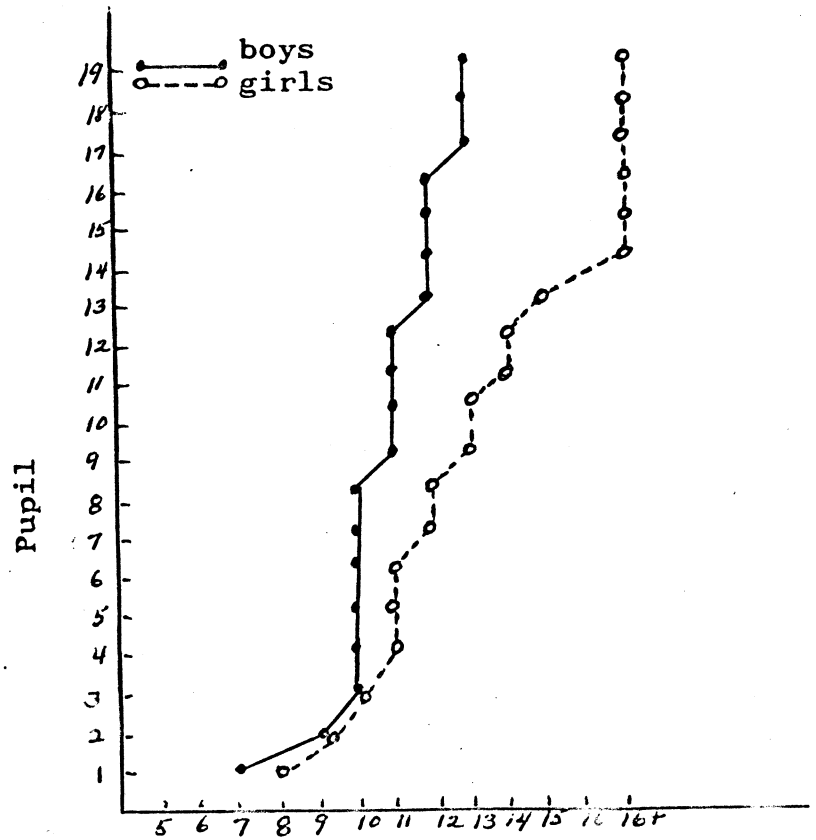


FIGURE 8. Diversity Between the Scores of Boys and Girls on Subtest I

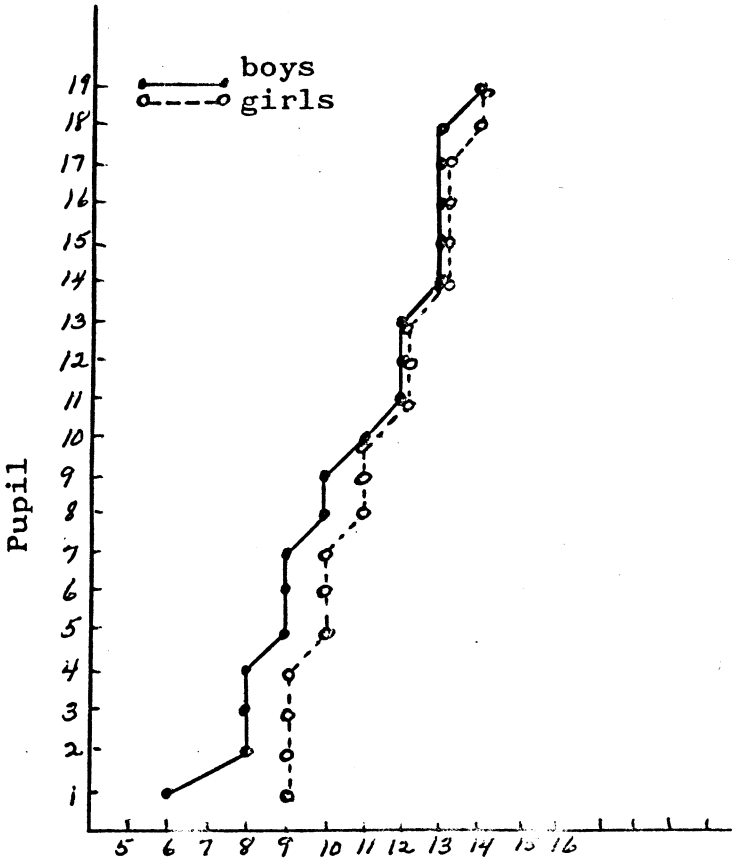


FIGURE 9. Diversity Between the Scores of Boys and Girls on Subtest II

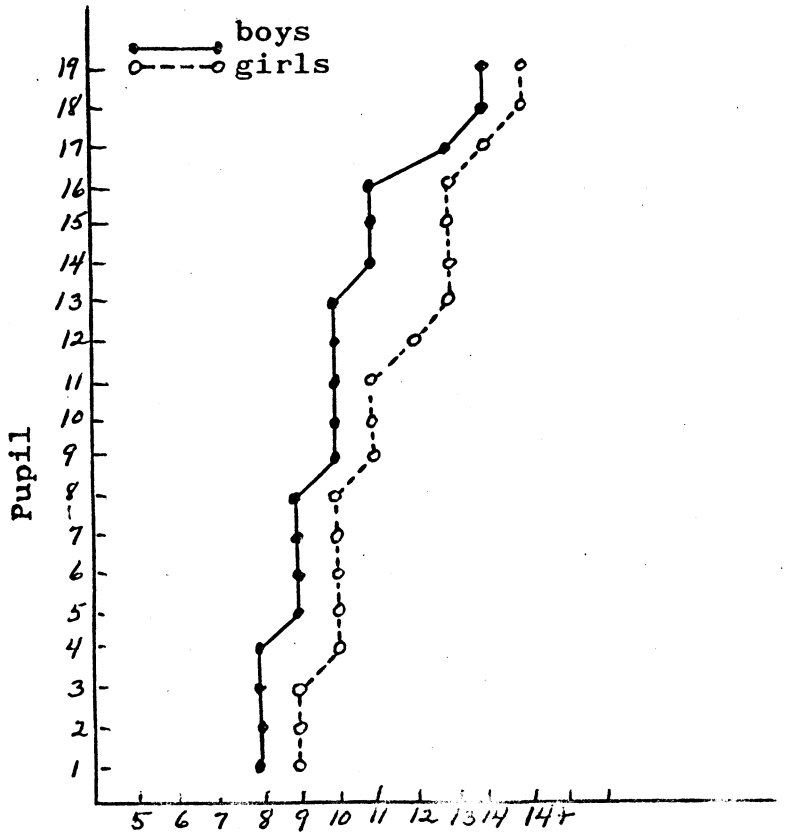


FIGURE 10. Diversity Between the Scores of Boys and Girls on Subtest III

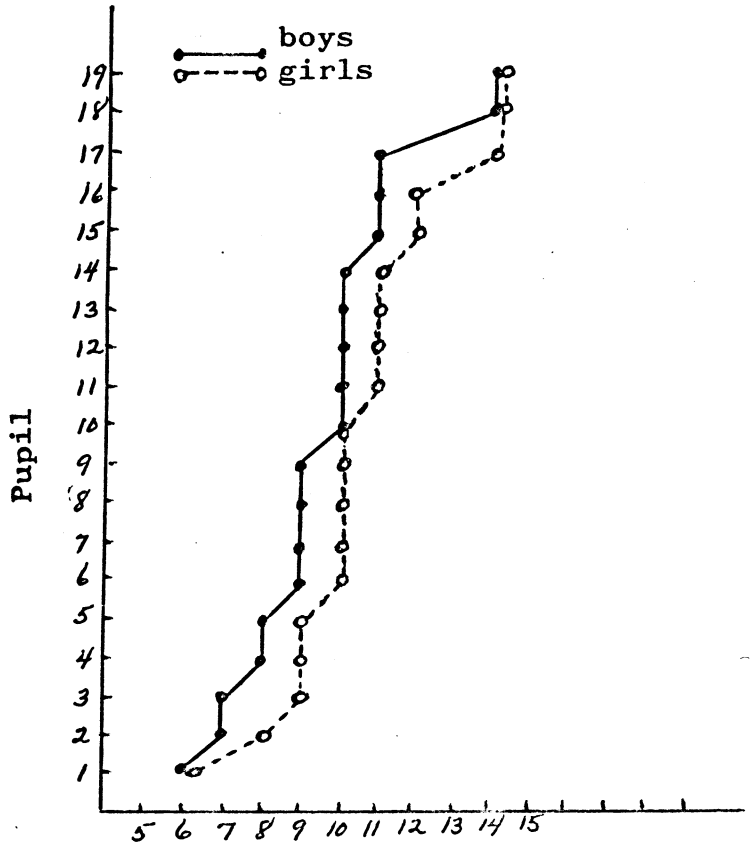


FIGURE 11. Diversity Between the Scores of Boys and Girls on Subtest IV

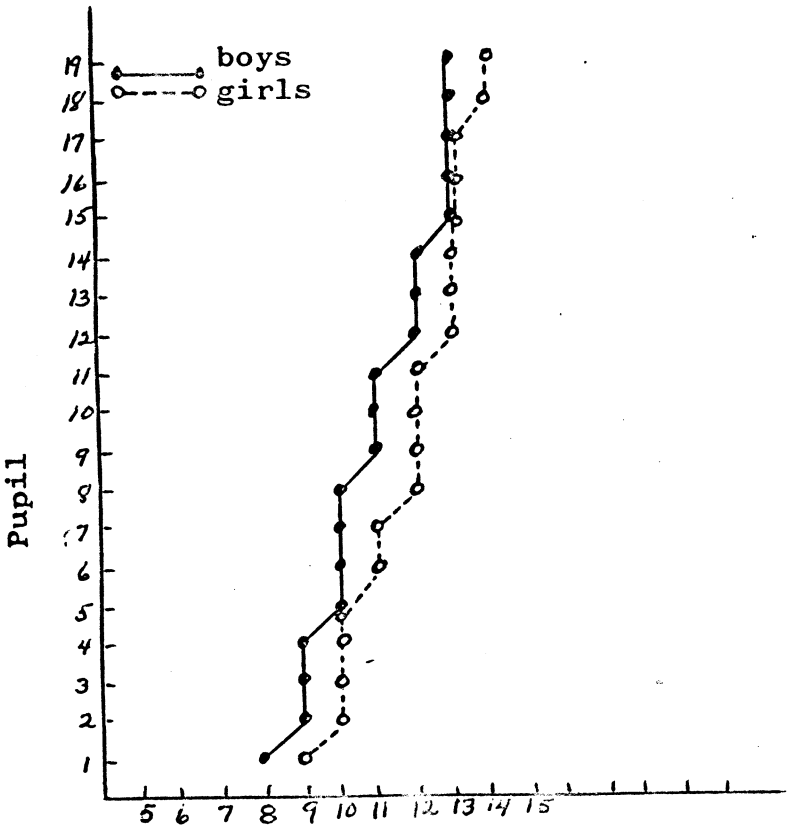


FIGURE 12. Diversity Between The Scores of Boys and Girls on Subtest V

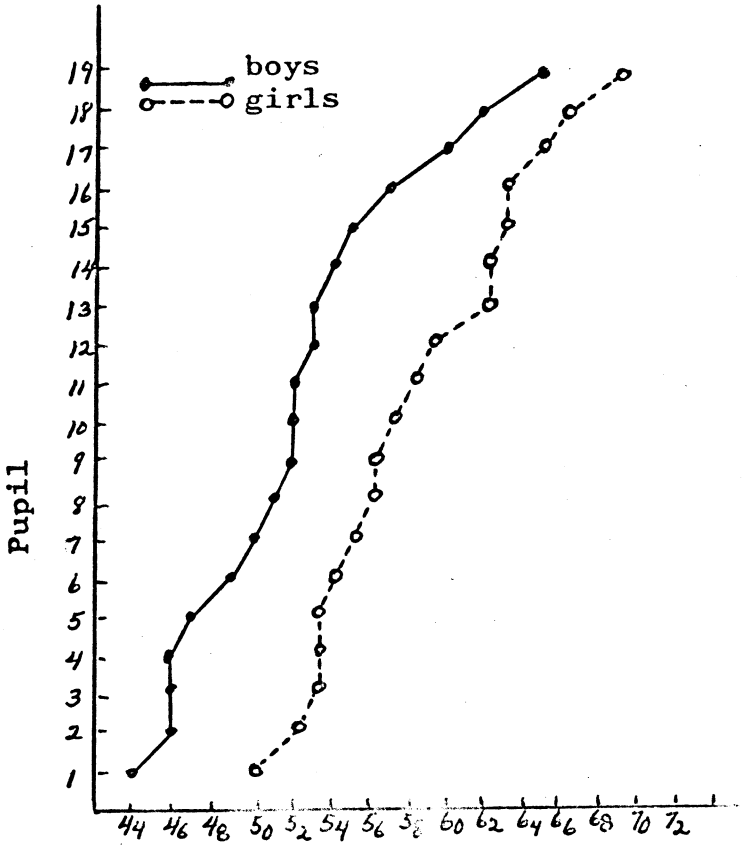


FIGURE 13. Diversity Between Total Test Scores of Boys and Girls

TABLE 3

RAW DATA CONCERNING BOYS IN STUDY

Pupil	SUBTESTS										Total Test		Perceptual Quotient
	I		II		III		IV		V				
	a	b	a	b	a	b	a	b	a	b	a *	b *	
Number 1	17	11	17	10	6	8	2	6	4	9	46	44	87
Number 2	16	11	17	10	8	9	4	7	4	9	49	46	92
Number 3	18	13	14	8	10	10	4	7	3	8	49	46	92
Number 4	6	7	16	9	10	10	7	10	5	10	46	46	92
Number 5	14	10	15	9	6	8	7	10	5	10	47	47	94
Number 6	12	10	12	8	9	11	6	10	5	10	44	49	98
Number 7	16	12	4	6	5	8	8	14	4	10	37	50	100
Number 8	16	10	19	12	9	9	6	9	6	11	56	51	103
Number 9	13	10	14	9	8	10	7	11	6	12	48	52	103
Number 10	14	10	18	11	9	10	6	10	6	11	53	52	105
Number 11	13	10	19	14	4	8	5	9	5	11	46	52	103
Number 12	17	12	19	13	7	9	6	10	4	9	53	53	106
Number 13	13	9	20	12	11	11	6	9	7	12	57	53	108
Number 14	15	11	13	8	13	14	5	8	7	13	53	54	108
Number 15	18	13	19	12	8	9	6	9	7	12	58	55	113
Number 16	17	12	20	13	11	11	5	8	8	13	61	57	116
Number 17	18	13	19	13	9	10	7	11	7	13	60	60	119+
Number 18	15	11	20	13	13	14	7	11	7	13	62	62	119+
Number 19	16	12	20	13	12	13	8	14	7	13	63	65	119+

* a - raw score
b - scaled score

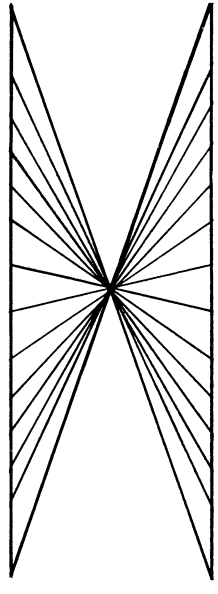
TABLE 4

RAW DATA CONCERNING GIRLS USED IN STUDY

Pupil	SUBTESTS										Total Test		Perceptual Quotient
	I		II		III		IV		V				
	a	b	a	b	a	b	a	b	a	b	a *	b *	
Number 1	16	11	16	9	7	9	6	10	6	11	51	50	100
Number 2	17	12	16	10	8	10	7	11	3	9	51	52	103
Number 3	11	10	17	11	8	10	5	9	6	13	47	53	105
Number 4	11	9	16	9	13	14	5	8	7	13	52	53	106
Number 5	17	13	15	10	8	10	5	9	5	11	50	53	105
Number 6	20	16+	15	9	7	9	6	10	5	10	53	54	106
Number 7	21	16+	19	13	6	10	2	6	5	10	53	55	108
Number 8	15	11	15	9	11	12	8	14	5	10	54	56	110
Number 9	18	14	18	11	10	11	6	10	5	10	57	56	110
Number 10	9	8	18	11	17	14+	7	11	7	13	58	57	116
Number 11	17	11	20	12	13	13	7	10	7	12	64	58	121
Number 12	18	13	19	12	14	13	6	9	7	12	64	59	124
Number 13	19	15	19	13	8	10	7	11	7	13	60	62	116+
Number 14	22	16+	18	12	10	11	6	10	6	13	62	62	116+
Number 15	21	16+	17	10	15	14+	7	11	6	12	66	63	116+
Number 16	17	12	20	13	9	11	8	14	7	13	61	63	116+
Number 17	19	16+	20	14	10	9	7	12	7	14	63	65	116+
Number 18	18	14	20	13	12	13	8	14	6	12	64	66	116+
Number 19	19	16+	19	14	12	13	7	12	7	14	64	69	116+

* a - raw score
b - scaled scores

APPENDIX II



Marianne Frostig

DEVELOPMENTAL TEST OF VISUAL PERCEPTION

In collaboration with: Welty Lefever, Ph.D. and John R. B. Whittlesey, M.S.

THIRD EDITION

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Marianne Frostig

DEVELOPMENTAL TEST OF VISUAL PERCEPTION

Third Edition

I. Eye-Motor Coordination

II. Figure Ground

III. Form Constancy

IV. Position in Space

V. Spatial Relations

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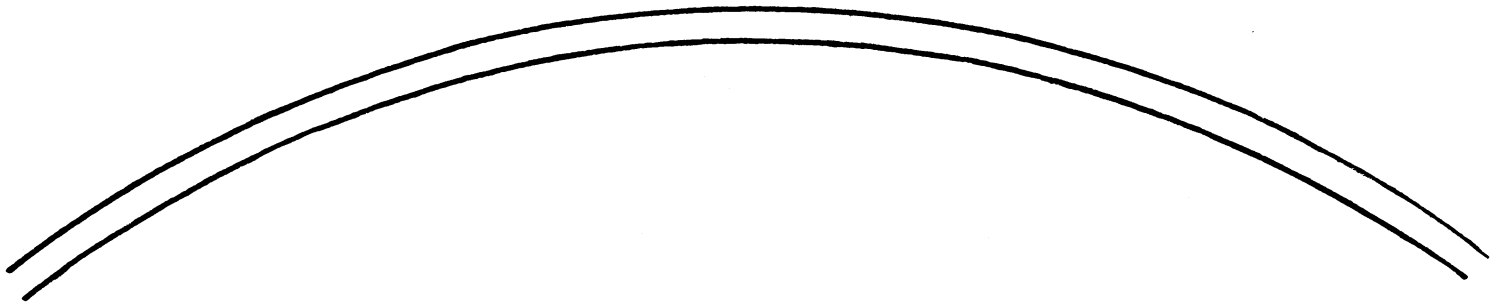

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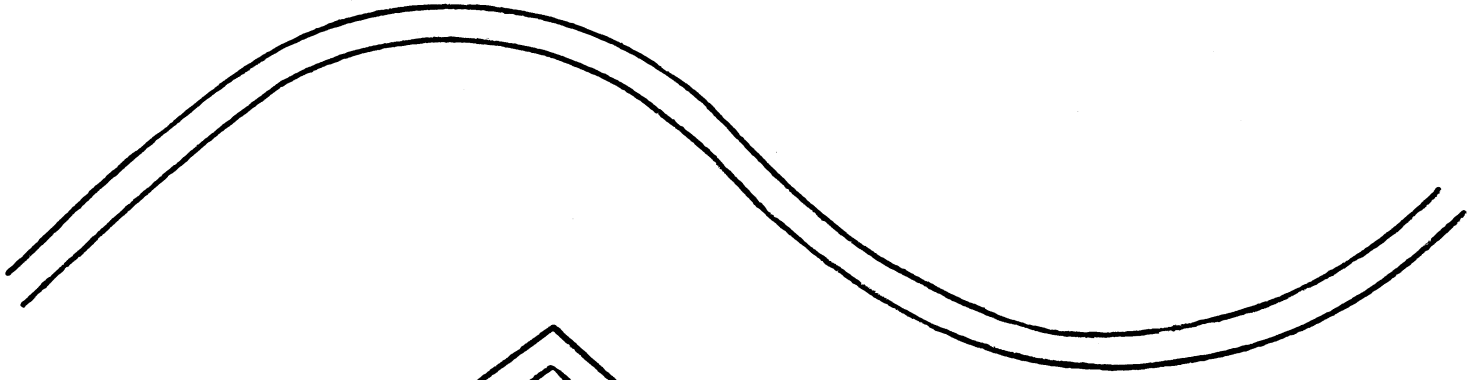

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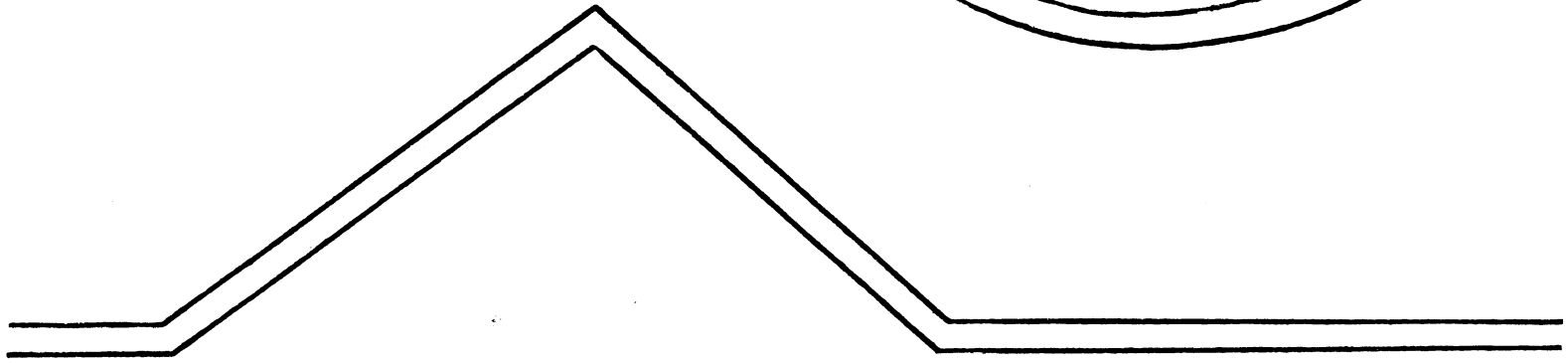

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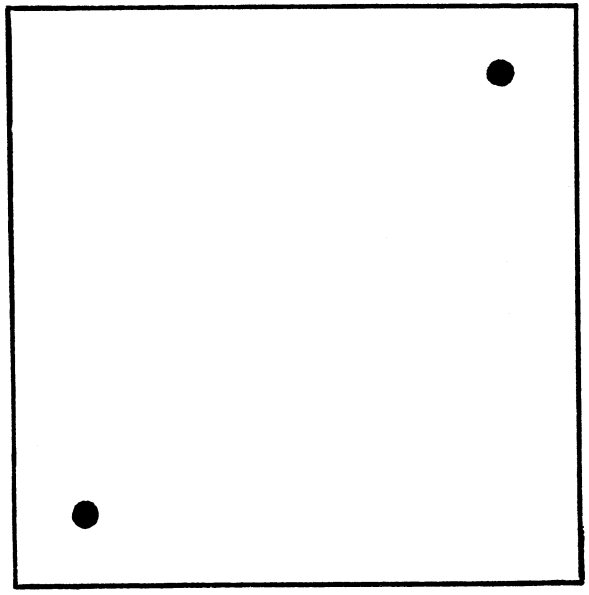

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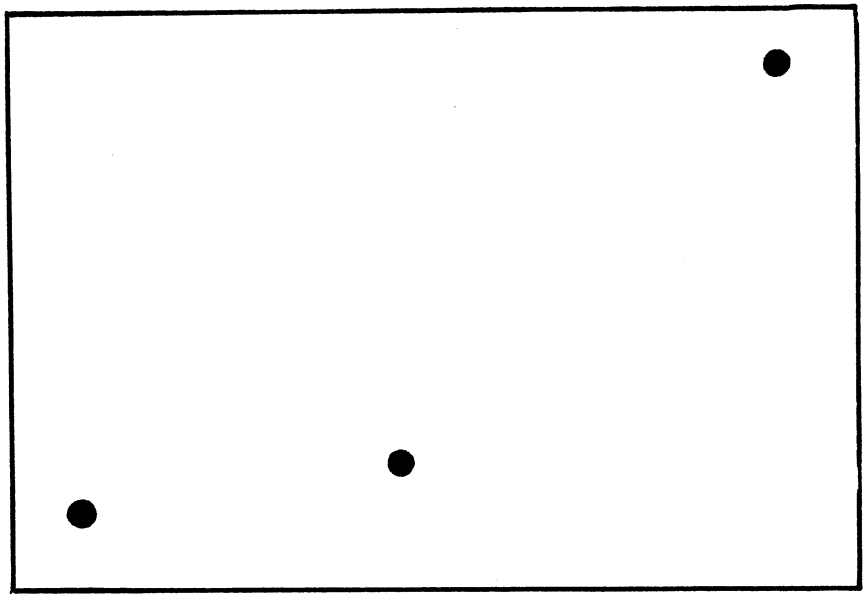

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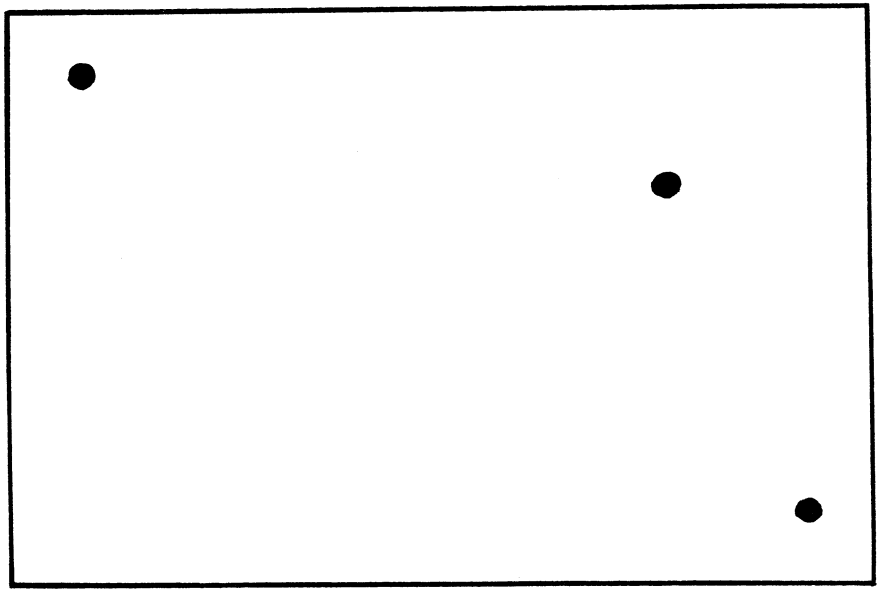

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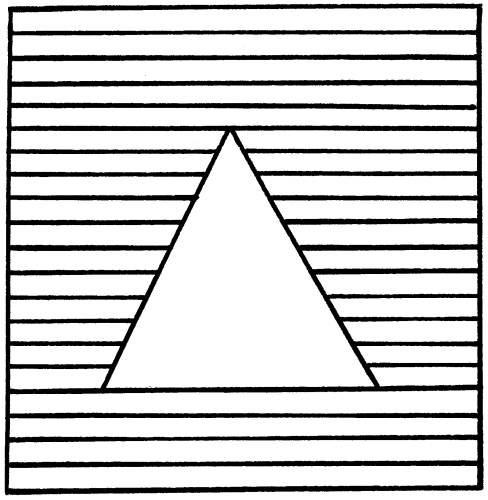

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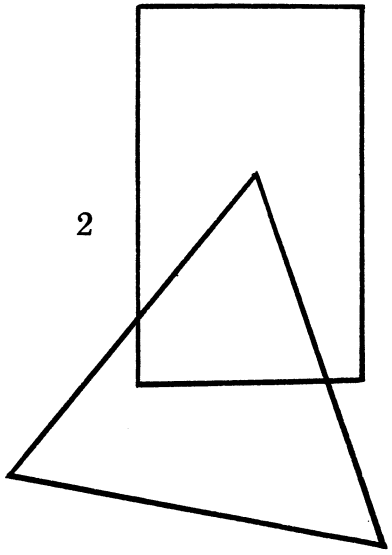

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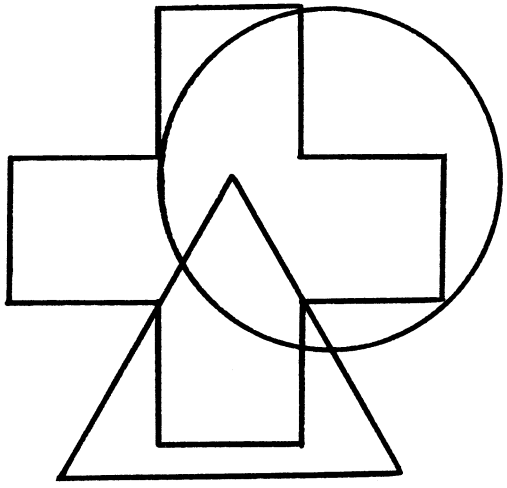

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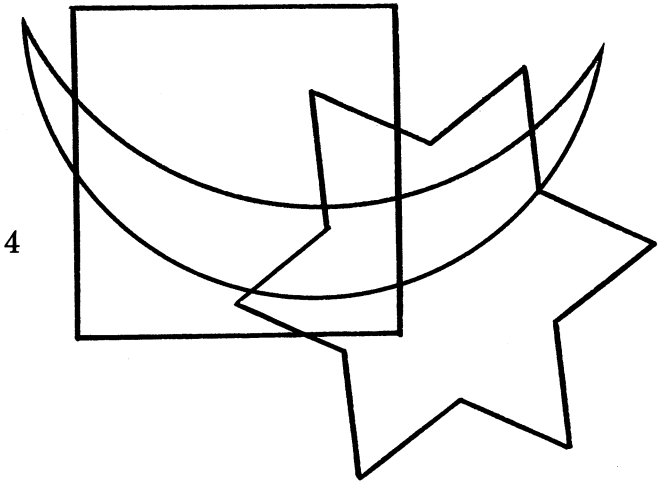

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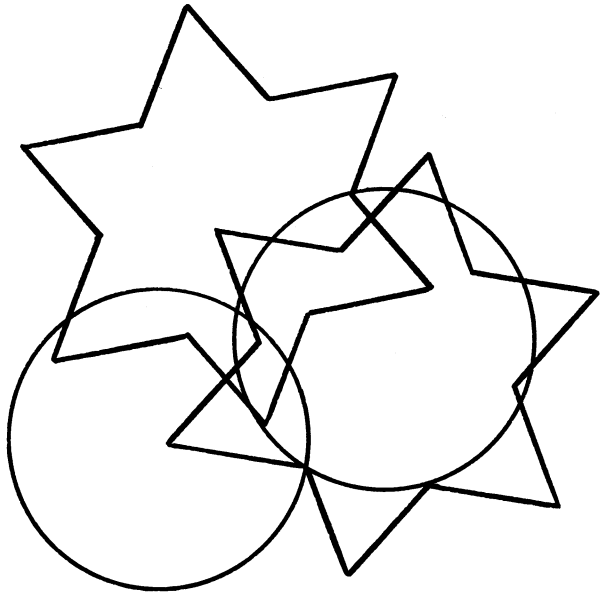

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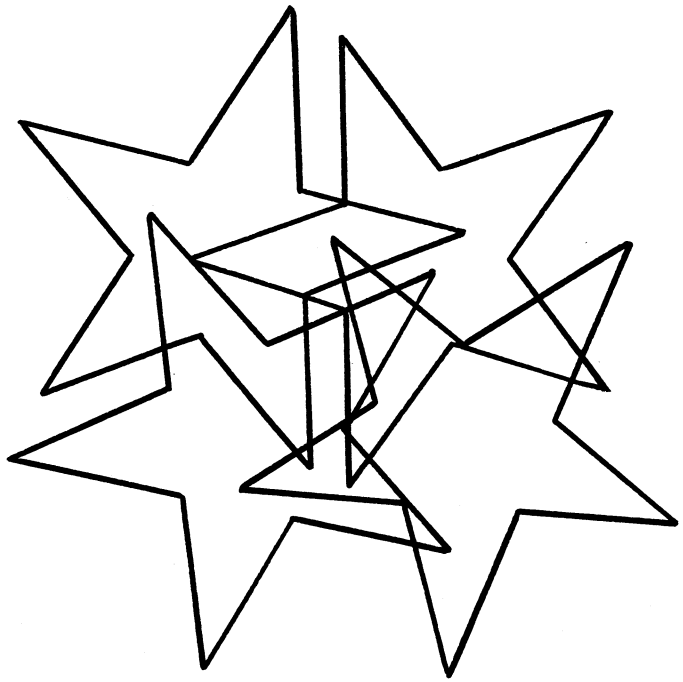

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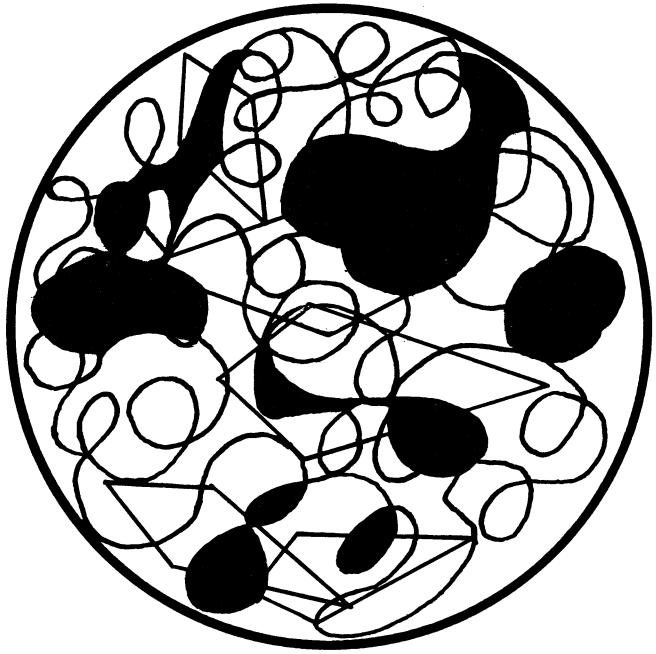

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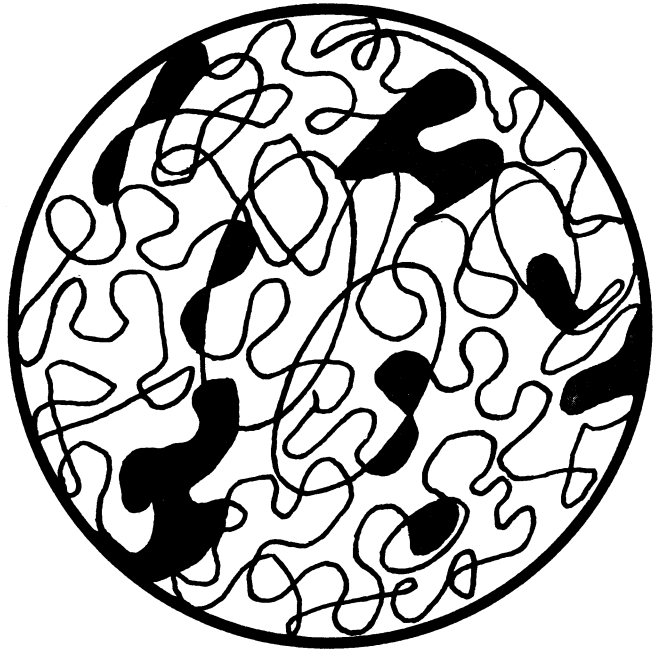

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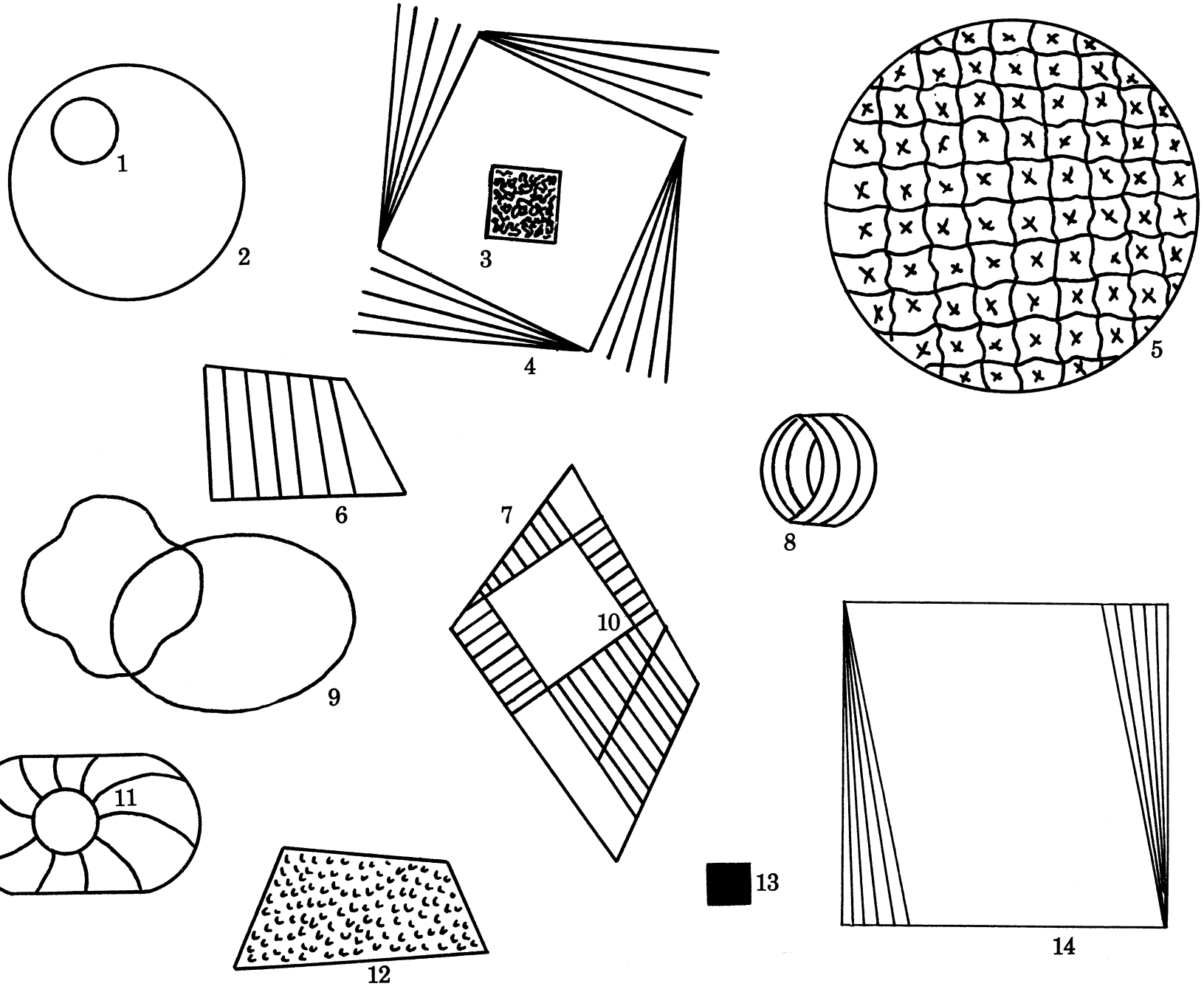

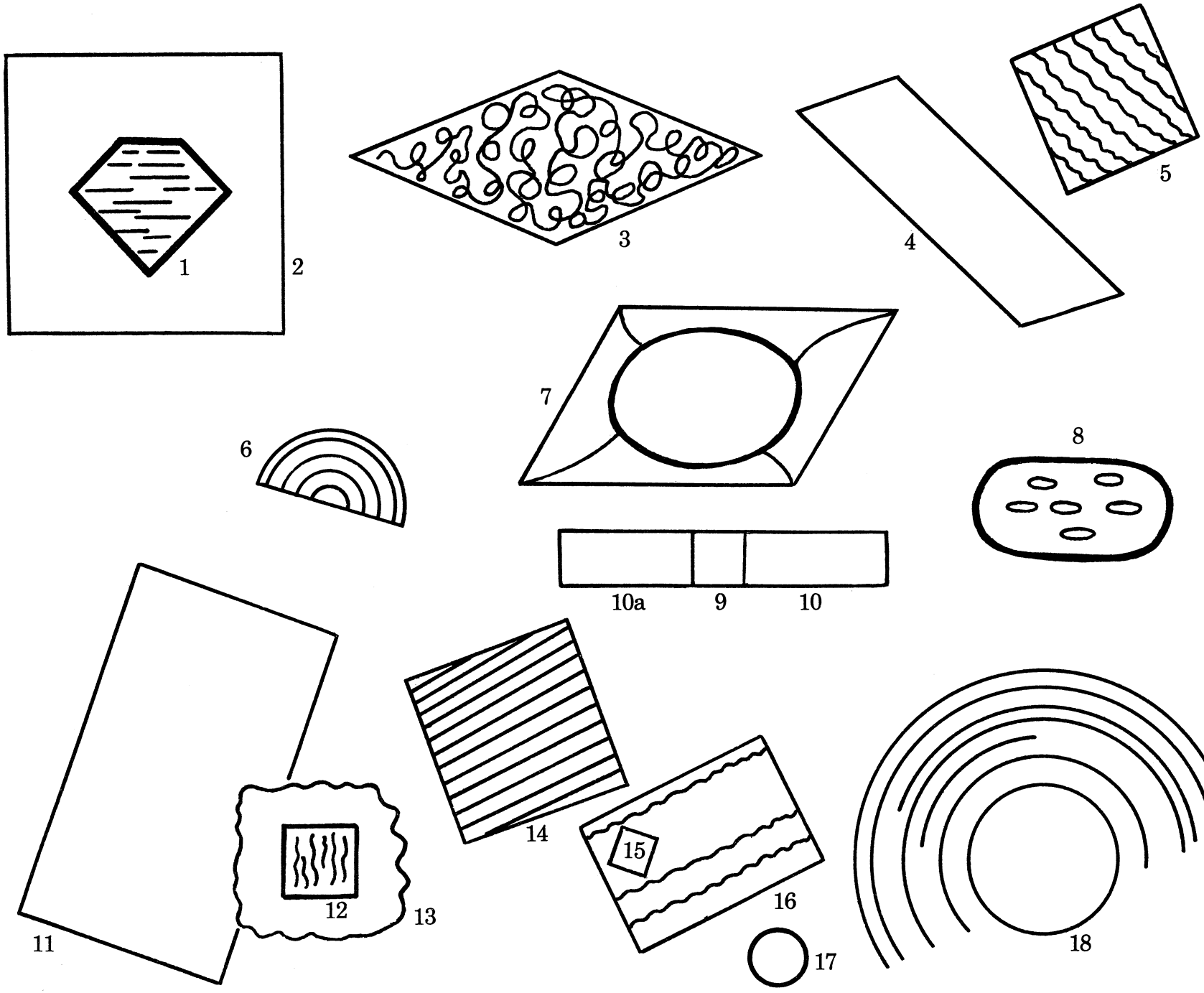
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IVa

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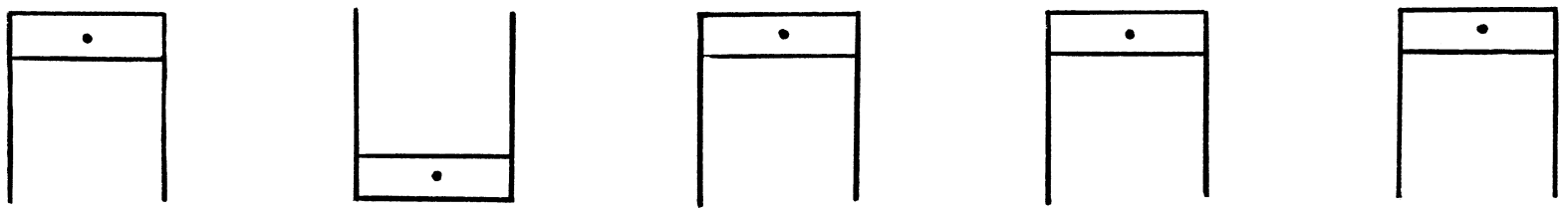

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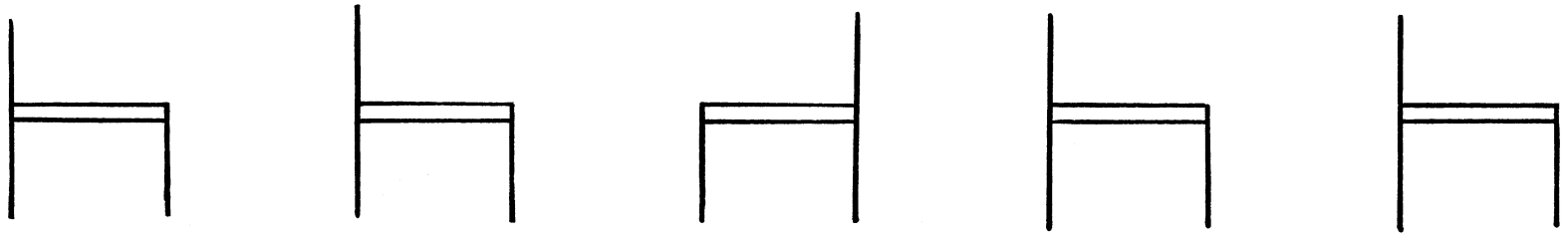

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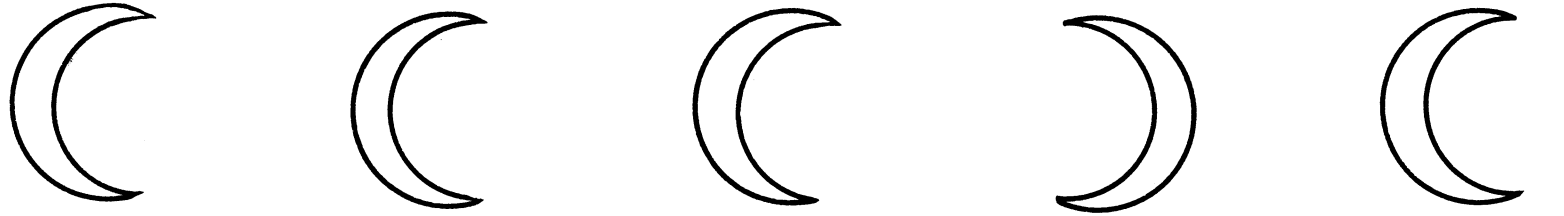

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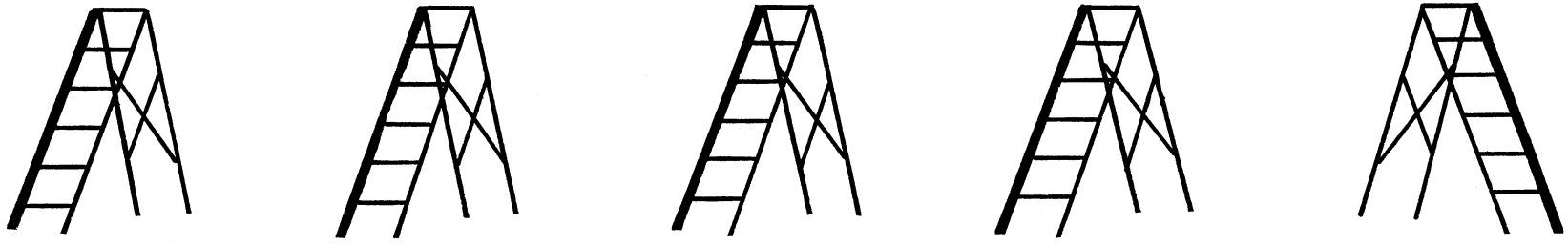

IVb

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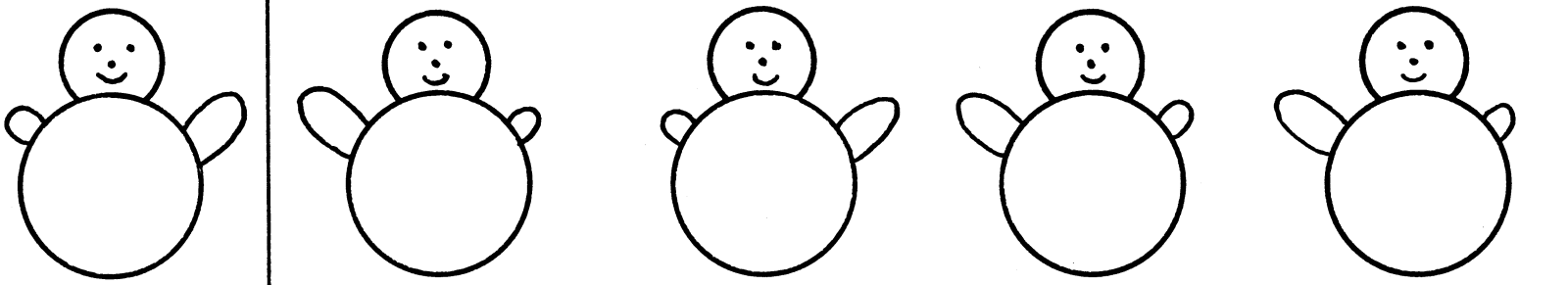

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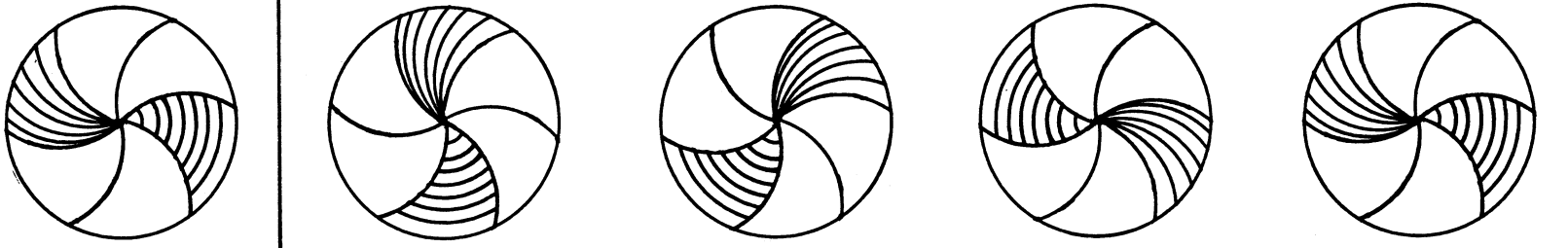

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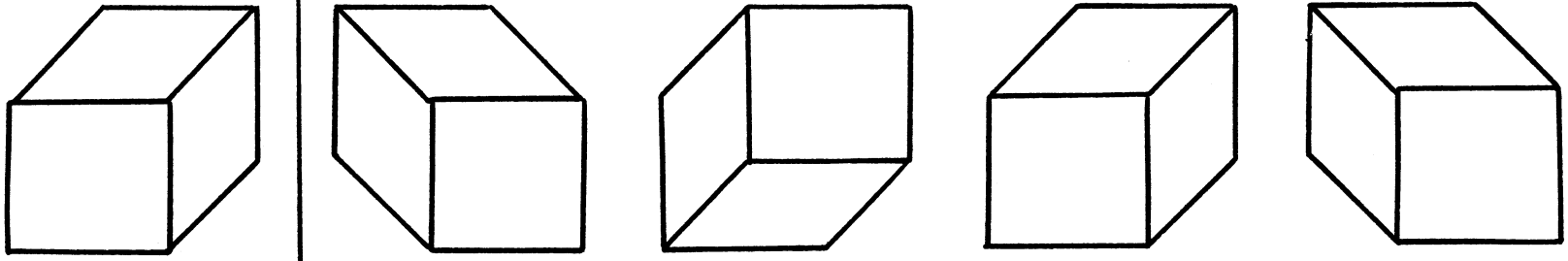

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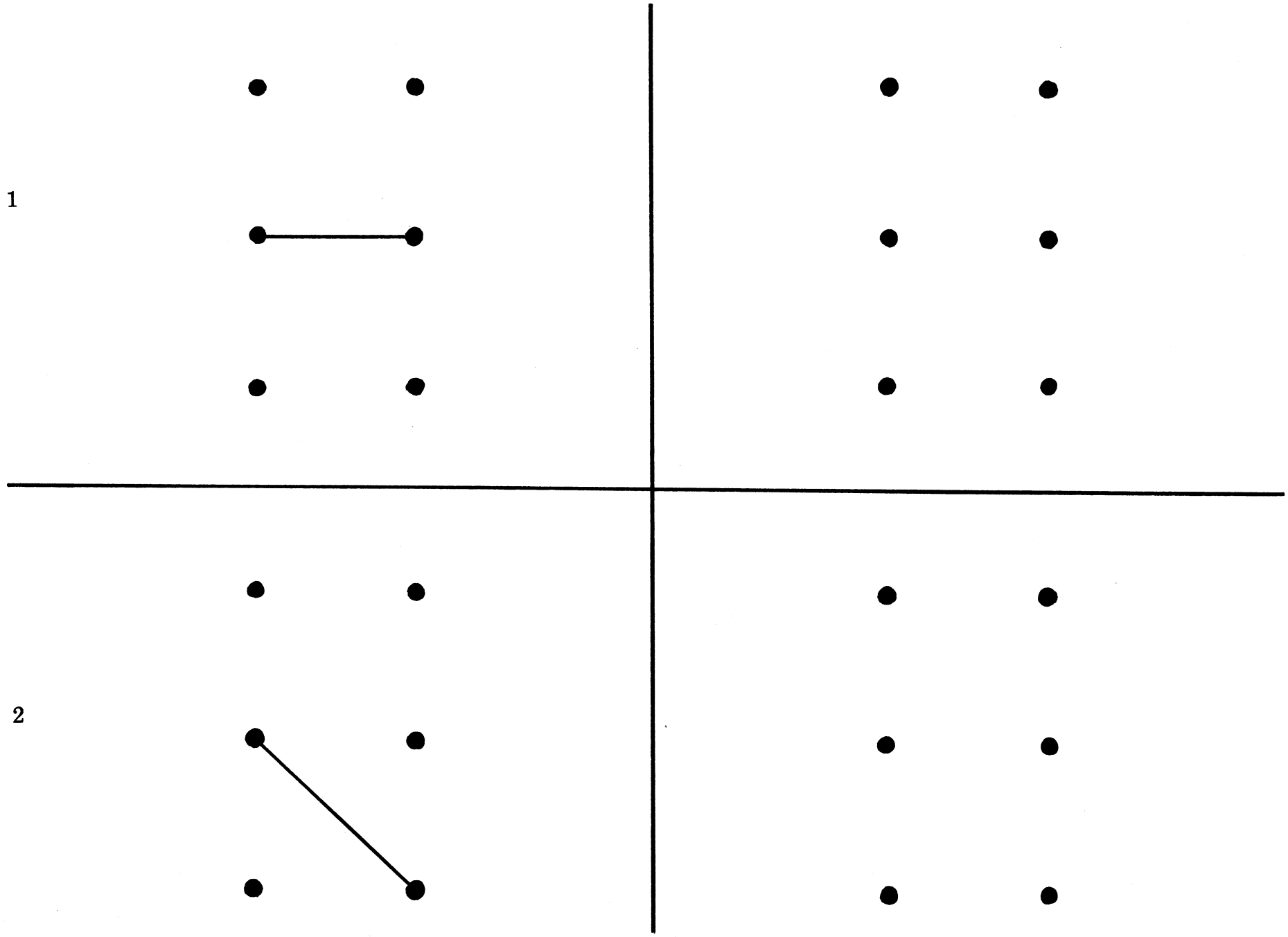

Vb

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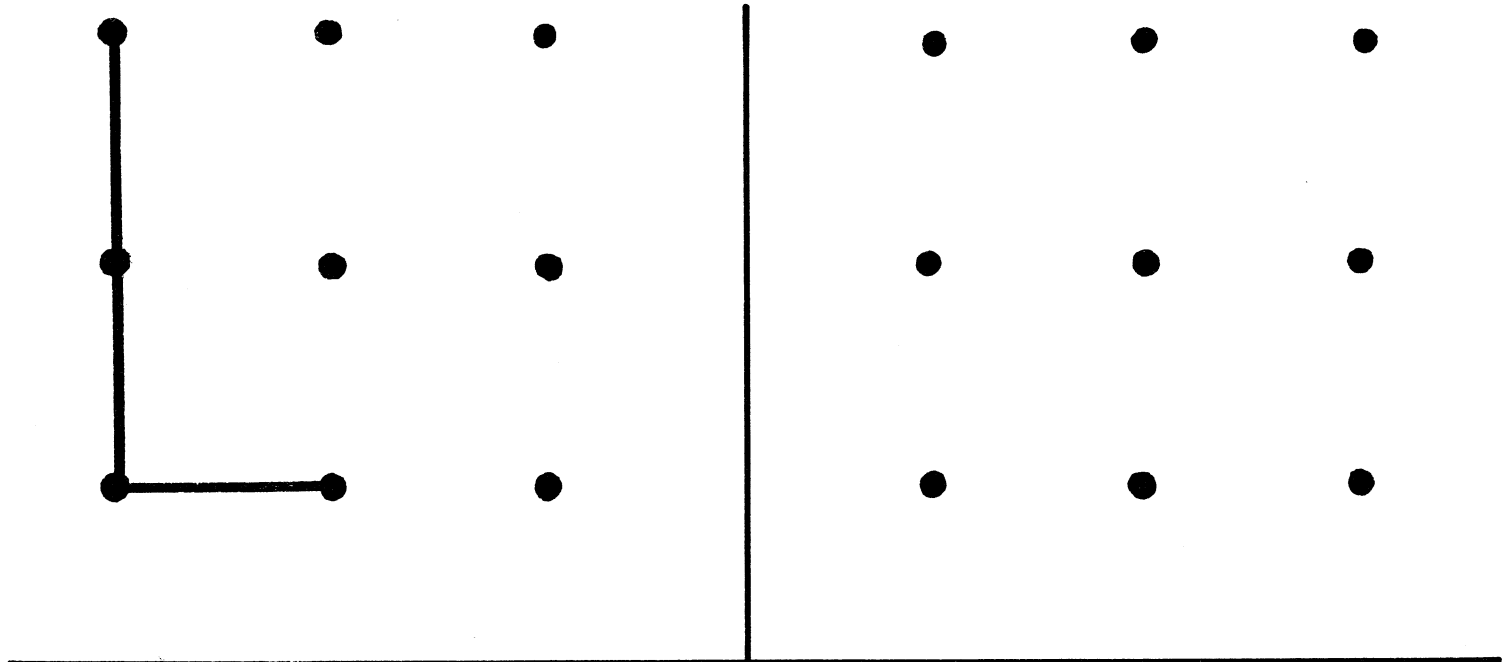

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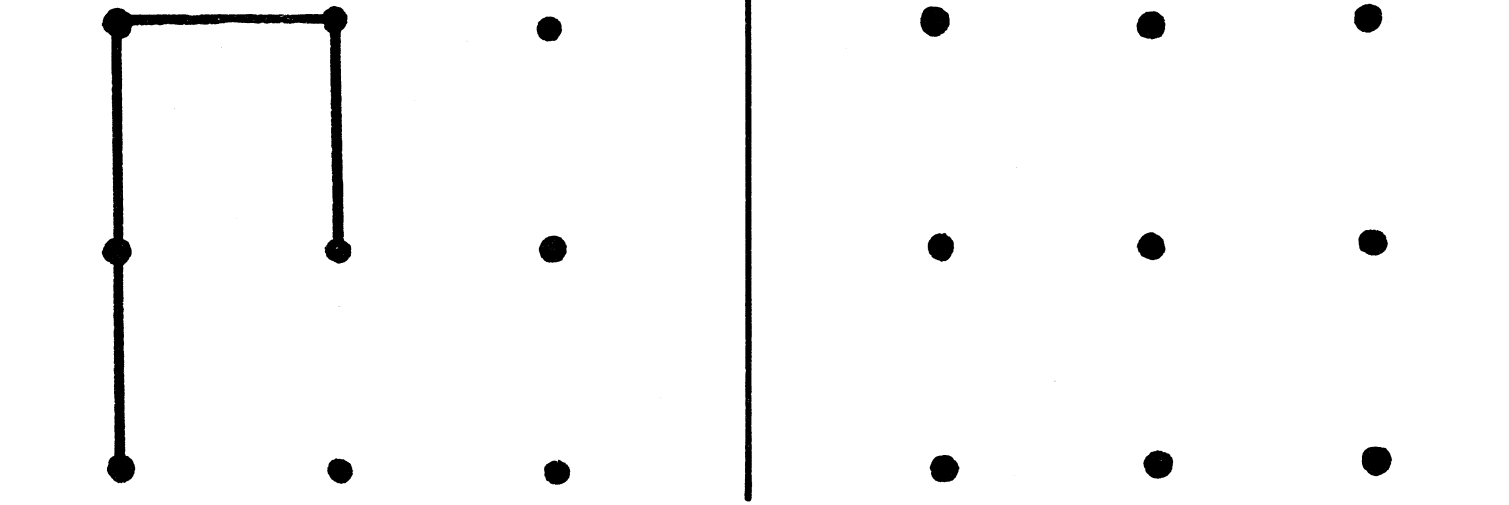

Vc

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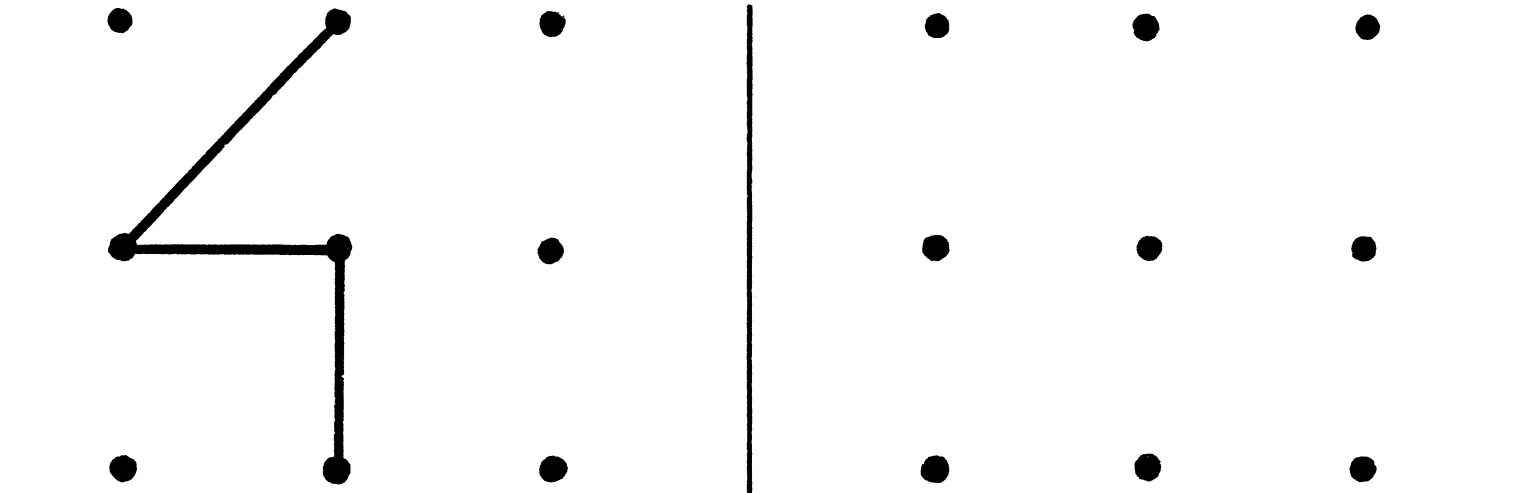

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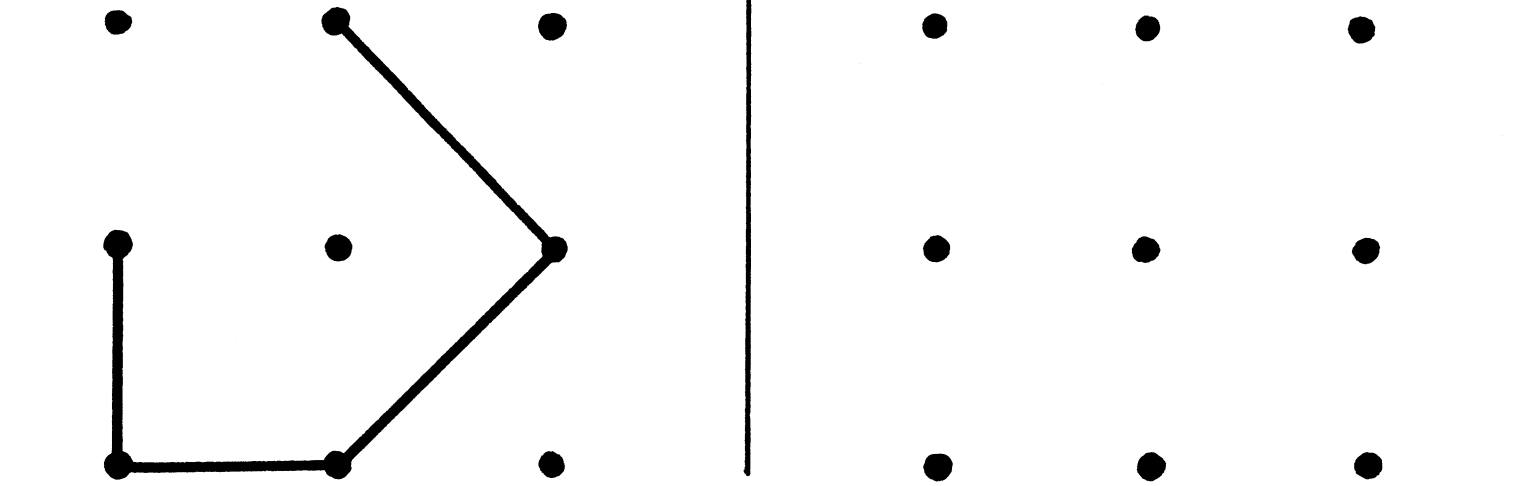
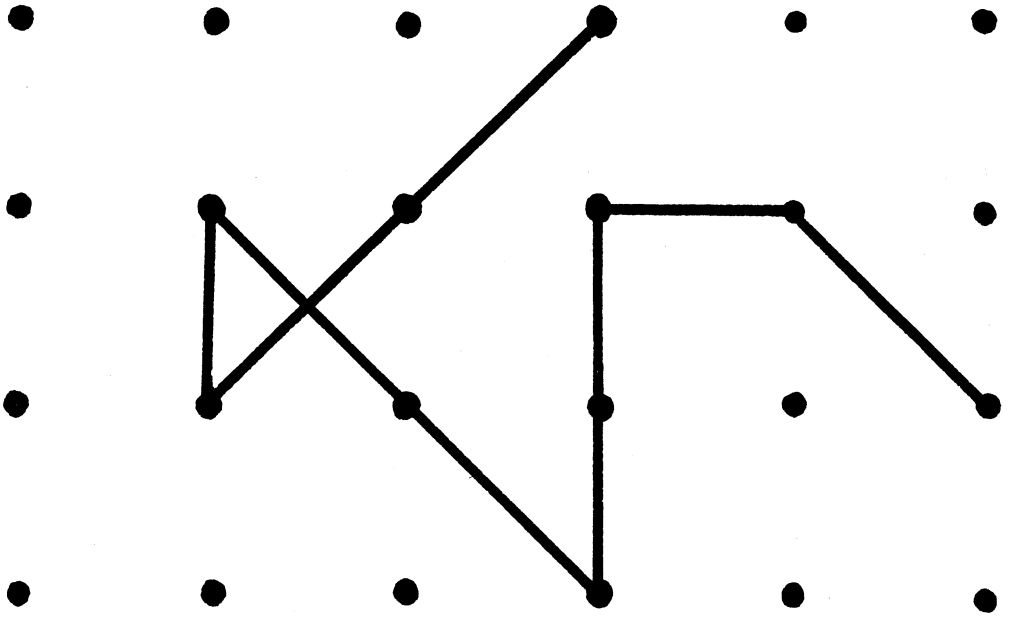


First Grade and up only

7



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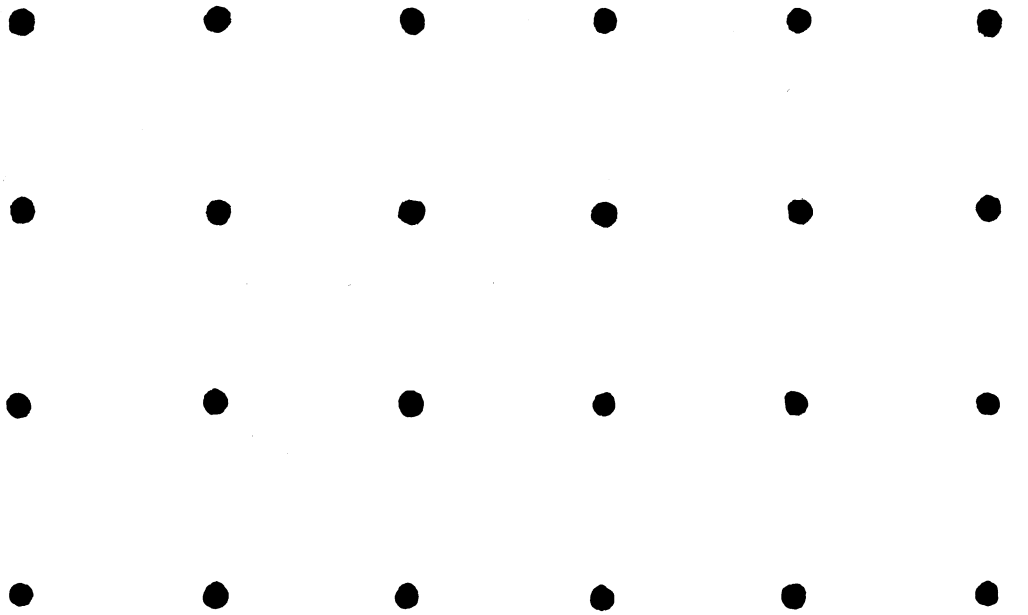

First Grade and up only

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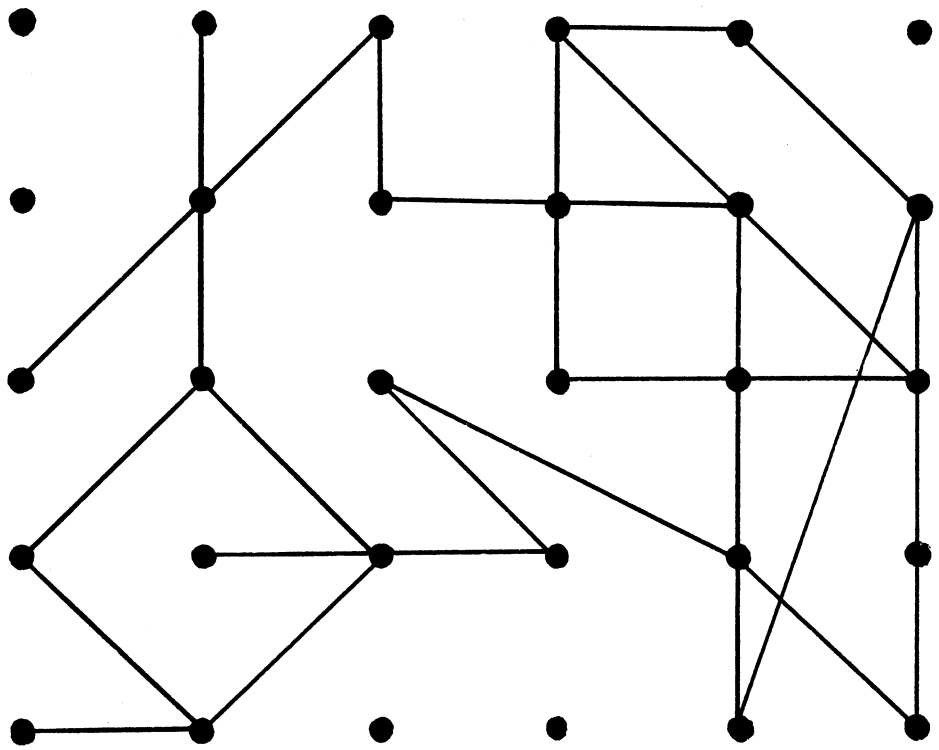

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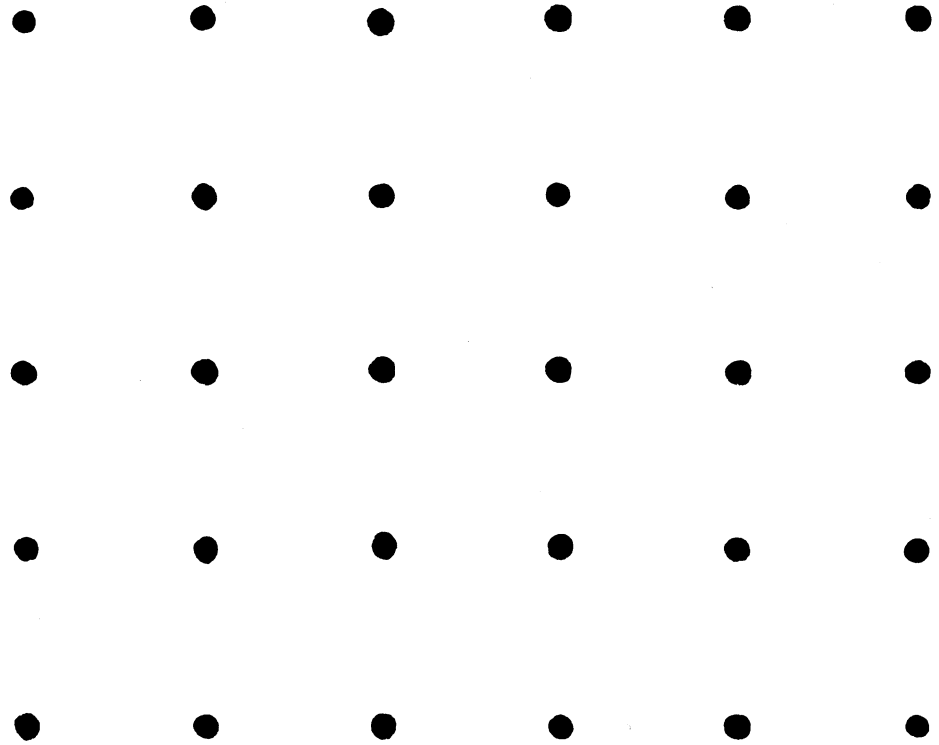

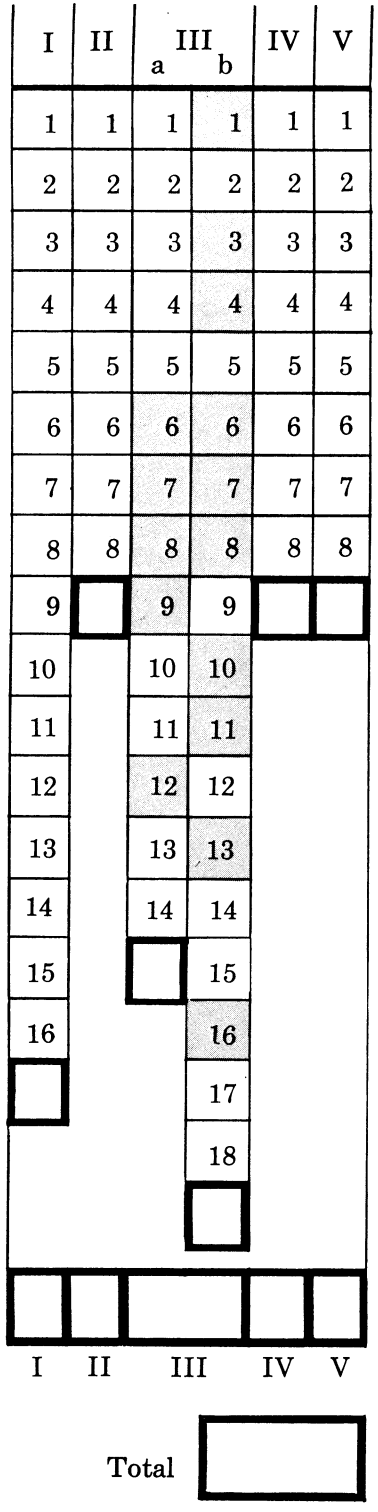

MARIANNE FROSTIG

DEVELOPMENTAL TEST OF VISUAL PERCEPTION

CHILD'S NAME .....

PARENT'S NAME .....

ADDRESS .....

..... TELEPHONE .....

	YEAR	MONTH	DAY
DATE OF TEST			
BIRTH DATE			
CHRONOLOGICAL AGE			

I.Q. ..... HANDEDNESS ..... GRADE .....

SOCIAL ADJUSTMENT .....

READING ACHIEVEMENT .....

MEDICAL DIAGNOSIS IF AVAILABLE .....

.....

DIAGNOSING PHYSICIAN AND AGENCY .....

..... TELEPHONE .....

EXAMINER .....

SUBTESTS	I	II	III	IV	V	
RAW SCORES						
AGE EQUIVALENTS						TOTAL
SCALED SCORES						
	PERCEPTUAL QUOTIENT					